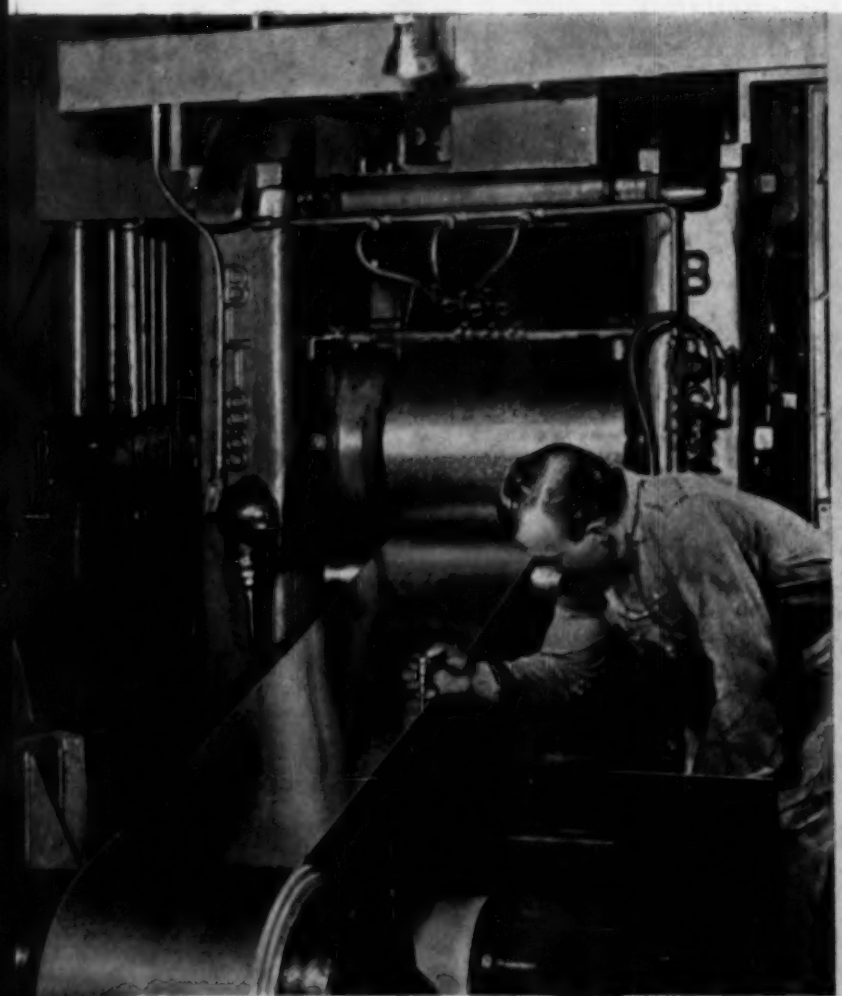
The Iron Age

A Chilton Publication

THE NATIONAL METALWORKING WEEKLY • JULY 21, 1955

Why your business costs are going up
See page 51



A Challenging New Product!

Steel strip with a rolled-in pattern design in a sparkling range of coatings and finishes

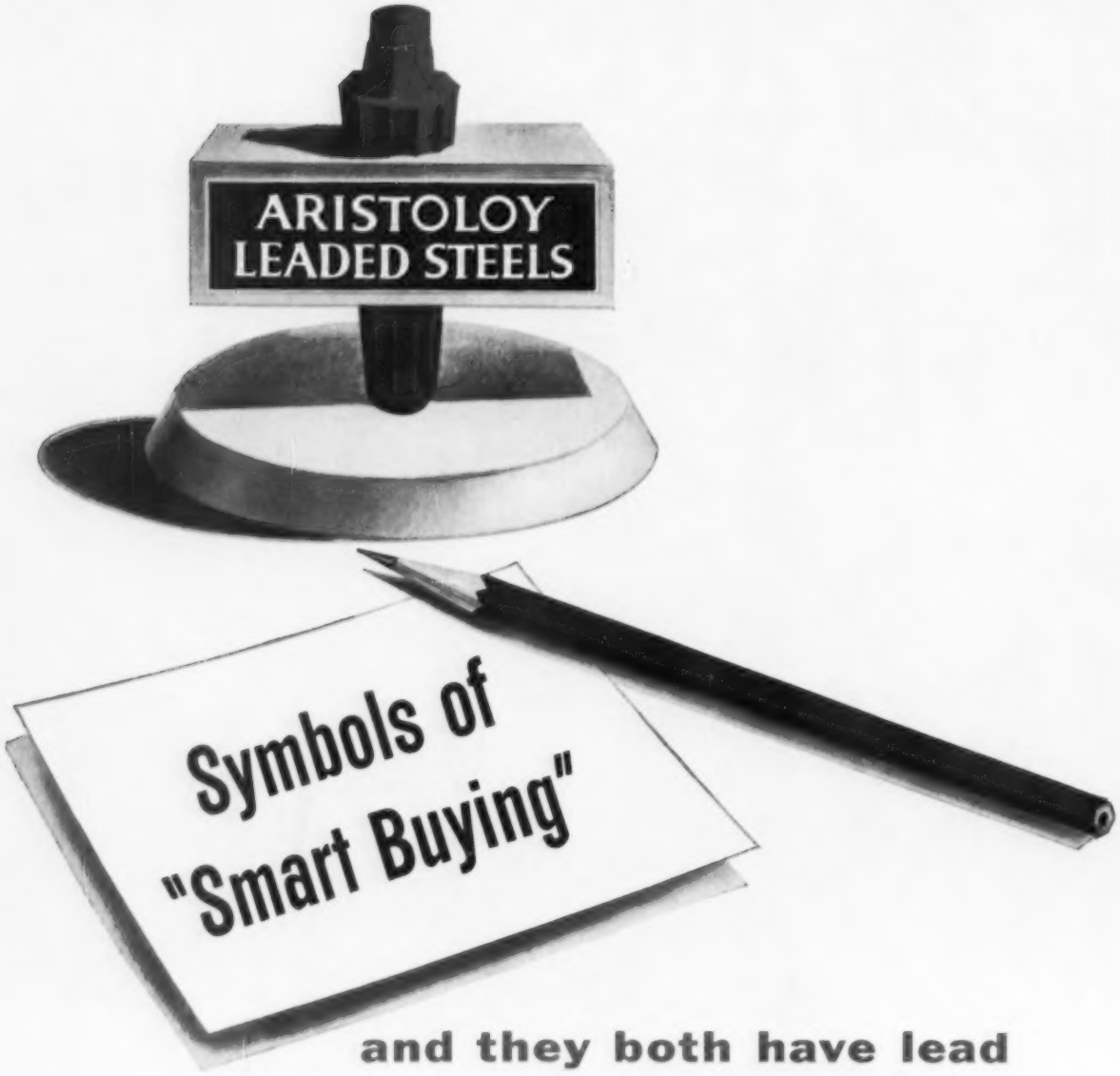
The new "Pattern Design" steel strip is offering product designers a challenging opportunity to improve product sales appeal and, at the same time, cut fabrication costs. It provides these advantages.

- You can now have almost any design you can draw on a piece of paper rolled into the surface of cold rolled strip steel.
- You can use it as plain uncoated steel or have it electrolytically coated with copper, brass, nickel, chrome, zinc or lead alloy . . . hot dip coated with lead alloy or tin . . . lacquer coated, either clear or colored.
- Coated strip, with the rolled-in design, is available to you in its attractive natural finish or in glittering planished or buffed finishes.
- The range of widths, thicknesses and tempers of steel makes it easy to fabricate at lower cost, and you gain the appeal of more expensive metals.

Developed by Thomas Strip engineers primarily for decorative purposes, this new product is finding eager acceptance in appliances, housewares, builders' hardware and other products. Why not write or call our closest district office today for complete details?

Thomas Strip®

Thomas Strip Division
Pittsburgh Steel Company
Pittsburgh 30, Pennsylvania



and they both have lead

Today's Purchasing Agent is recognized as part of the executive management team. Why? Because the modern PA, using value analysis, is looking beyond initial cost to specify products that can be purchased to be produced at a profit.

Parts machined from Ledloy* give production line savings.

Freer machining, faster feeds and speeds and longer tool life add value through each manufacturing step.

Because Ledloy cuts clean for finer finish, its use sometimes eliminates final machining.

The end result—a total saving accumulated step by step from rough stock to finished product that makes Ledloy a "smart buy."

*Inland Ledloy License

COPPERWELD STEEL COMPANY / STEEL DIVISION / WARREN, OHIO

There's Never Any Question About a Bethlehem Drop Forging

You can be sure of top quality in a drop forging made by Bethlehem.

You can be sure that the steel is right, that the dies are right. You can be sure that the forging work is done conscientiously by men long skilled in their trade.

Bethlehem shops furnish an almost endless variety of designs for the oil, mining, aviation, automotive, electrical, and other industries. Both quality and variety are made possible by excellent facilities, which include modern die-sinking shops, steam and board drop hammers to 8,000 lb, mechanical presses to 3,000 tons, upsetters to 9 in., and full heat-treating equipment.

When you are figuring your next requirements for closed-die forgings, we'd appreciate the chance to talk with you. We offer excellent service, a first-class product, and competitive prices and deliveries.

BETHLEHEM STEEL COMPANY
BETHLEHEM, PA.

On the Pacific Coast Bethlehem products are sold by Bethlehem Pacific Coast Steel Corporation. Export Distributor: Bethlehem Steel Export Corporation

BETHLEHEM STEEL

BETHLEHEM STEEL

the Iron Age

Vol. 176, No. 3 July 21, 1955

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NEWS DEVELOPMENTS

INFLATION PRICE SPIRAL THREATENS — P. 51
It will cost more to do business in the next few months. Few industries are in a position to keep present price levels. Increased labor costs are responsible for most price boosts. And more are coming in industries that have not negotiated their contracts this year. Auto prices should hold in current model year, but some costs will have to be passed on. $50 to $100 auto price hike predicted next year.

HOOVER REPORT CAN SAVE BILLIONS — P. 54
Former president's commission drops bombshell on entrenched government. Adoption of most proposals could save $250 billion in government costs. Program needs encouragement from industry. Congressmen are slow to get behind the commission for fear of upsetting routine or cutting patronage.

BODY ARMOR BOUNCES BACK AGAIN — P. 57
Korean fighting showed that protective clothing has a place in modern fighting. Shrapnel wounds were cut way down by fabric vests used by the services. Police and others make use of bullet-proof vests that employ steel plates and stop hand fire.

TOUGH TESTING BUILDS BETTER AUTOS — P. 68
Ford expands its testing facilities with new proving ground at Romeo, Mich. Crash studies documented by scales, high speed photography and instruments lead to improved auto safety. One result is optional seat belts offered by both Chrysler and Ford. Chrysler continues integration program.

WASHINGTON PLANS MORE DEFENSE DRILLS — P. 73
President Eisenhower wasn't happy over the showing the government made in the last defense alert. Also it is felt that businessmen need stirring up on the question of defense. For this reason, bigger and better mobilization exercises are coming with war games and broader industry participation planned.

PLANT SAFETY PROGROM PAYS DIVIDENDS — P. 77
Alcoa's plant on West Coast uses three-man staff to cut accident rate below industry level. Spreading responsibility through all worker classifications is a big factor in eliminating costly lost time injuries. Thorough accident investigation is vital to safety.

IN METALWORKING

ENGINEERING & PRODUCTION

STEEL STRIP CUT-UP LINE EASES HANDLING — P. 91
Hot-rolled steel strip can be cleaned, oiled and cut to size more efficiently and in less time in an unusual strip cut-up line. It provides better material realization and greatly reduces direct labor. Shot blast cleaning replaces all pickling. Handling operations are pared to a minimum by novel methods.

ULTRASONIC TEST DETECTS COARSE GRAINS — P. 95
A recent study shows that nondestructive ultrasonic testing can detect grossly coarsened grain structure in some finish machined steel parts. Such coarsening, often a result of overheating in heat treatment, can be a factor in service failure. Overheated samples of 1045 steel show a pronounced sonic effect.

REPAIRS STAND UP UNDER HEAVY SERVICE — P. 98
Cost and downtime can be cut substantially by repairing broken forge shop machinery parts by thermit welding. Repair of a large cast steel anvil on a drop hammer cost $12,000. Replacement would have cost $23,000—and with downtime, it would have been more than $100,000. Repairs can be made quickly, permanently.

NEW DEVELOPMENTS OUTLINED BY SAE — P. 100
New developments in engine design, materials, die design, testing techniques and others highlighted recent SAE sessions. Cylinder blocks, wheels, brake drums, grilles, knobs, housings and many other parts are definite possibilities for greater use of aluminum.

MULTIPLE-SPINDLE MACHINES BOOST OUTPUT—P. 103
Higher production, less floor space and downtime are benefits achieved at Ford Motor Co. through the use of automatic chucking machines. On the head end of standard transmission main drive gears, the 8-spindle units have increased production about four times. Machine rigidity contributes to closer machining accuracy.

MARKETS & PRICES

SCRAP MARKET SURGES AFTER SPRING SLUMP—P. 55
Scrap prices are moving upward. They started climbing in the middle of June and are now advancing on all fronts. What happened, an early spring price decline dried up scrap sources. A tighter market was due in the normal course of events. Then the fast strike settlement and the continued strong demand for steel gave added force to rising market. Dealers tightened their offerings, and brokers are scrambling to cover orders.

ATOM-ELECTRIC POWER GOES ON SALE — P. 59
First sale of atomic-electric power will be made shortly to a private power corporation. Steam from a prototype submarine reactor will be channeled into a 10,000-kw turbine generator to be installed and operated by General Electric Co. Application marks a new era in commercial use of atomic-electric power on land.

NO RELIEF FROM TIGHT STEEL MARKET — P. 147
A balance between steel supply and demand is nowhere in sight. Producers report incoming orders still strong and their backlogs still heavy. It looks as though consuming industries will continue to apply pressure for deliveries throughout the year. The order backlog is such that for some products there may be further rationing of supplies in an effort to establish equitable quotas for hard-pressed consumers.

SMALL PRODUCERS HOLD STRIP PRICE DOWN—P. 148
The small cold-rolled strip producers have forced some major mills to backtrack on a $14 a ton CR-strip increase. Due to competition, smaller companies last week decided to hold the increase to $10 a ton. Reasons: (1) competition from slit sheet, (2) belief that circumstances justified only the $10 boost. Detroit Steel Corp. was an early rebel against the $14 increase.

NEXT WEEK:

WHAT MAKEUPS TO USE FOR ALKALINE SOLUTIONS
Hundreds of cleaner formulas exist, but alkaline cleaners are compounded from relatively few chemicals. They may be applied by means of a steam gun, by soaking, spraying, tumbling or scrubbing, or electrolytically. Sodium hydroxide, sodium metasilicate, trisodium phosphate, sodium carbonate will do most jobs.

WHAT'S STEEL SUPPLY OUTLOOK FOR 1956?
Steel consumers are wondering what's in store for them in the way of steel supply in 1956? Iron Age editors have been beating the bushes, interviewing steel companies and leaders in the various steel consuming industries to get the lowdown on what's cooking for next year. Their report will be helpful and enlightening.

Goodbye to old quench and temper methods!

SEE HOW

Martempering & Austempering CUT COSTS

FOR THESE LEADING MANUFACTURERS!

Shown here are typical examples of important production savings made possible by Ajax Electric Salt Bath martempering and austempering. And there are hundreds more!

Here, briefly, are the reasons for the outstanding superiority of this method: *First cost of equipment is only 1/2 to 1/5 that of any other conventional system!* Distortion is so negligible that parts can usually be finish machined *before* hardening. Final grinding is seldom necessary. Scale, decarb and quench cracks are avoided. Ductility is increased.

WRITE FOR TECHNICAL BULLETIN #500, *"The Present Status of Austempering and Martempering" — also list of documented case histories of martempering and austempering installations covering a wide variety of industries.*

$50,000 Saved ANNUALLY!

Austempering this well-known electric shaver head (0.003" thick) in an Ajax furnace scored a $50,000 a year saving over conventional quench and temper methods! Austempering produced tougher heads. Rejects due to cracks were reduced from 3.6% to .05%. Uniform hardness is obtained. Distortion is easily held within specified limits.

Grinding TIME Cut 80%

Martempered in Ajax furnaces and drawn to Rc 62-63, these SAE-52100 bearing races show an average out-of-round distortion of only 0.002-0.003" in heat treating. Grinding time was reduced from 50 minutes to less than 10 minutes per race.

One Man HANDLES ENTIRE Production

Lawn mower blades (SAE-1065) are austempered in a fully mechanized Ajax salt bath line to produce the critical combination of Rc 48-52 PLUS high ductility. Finished blades can be bent to horseshoe shape without cracking . . . and they're tough enough to cut nails! Production is 550 blades an hour. One man handles the entire job!

Zero Cracks AND Higher Rc

Section size of this high alloy valve plate varies from ½" to 1⅝". Conventional oil quench and temper methods failed to produce Rc 58-60 without cracking. Martempering and drawing in Ajax salt baths produced a hardness of Rc 60-64 . . . WITHOUT CRACKS!

AJAX HULTGREN electric SALT BATH furnaces

AJAX ELECTRIC COMPANY 904 Frankford Ave. **Philadelphia 23, Pa.**

Associated Companies: Ajax Electric Furnace Corp. • Ajax Electrothermic Corp. • Ajax Engineering Corp.

The First Morgan Continuous Rolling Mill

The First Successful U. S. Continuous Rod Mill was built in 1888 by MORGAN WORCESTER

Since then some 210 Morgan Rolling Mills of various types have been built and installed

These mills are located in 16 countries, and are rolling a high percentage of the world's output of rods, billets, narrow strip, skelp and merchant shapes.

A few Morgan Rolling Mill Contributions Developed and Patented since 1882

- Continuous Billet and Sheet Bar Mill
- Continuous Skelp Mill
- Continuous Mill—Twist Guides
- Automatic Rod Reel
- Continuous Billet Heating Furnace
- Hydraulic Flying Shear
- Steam Flying Shears
- Up and Down Cut Flying Shear
- Duo-Finishing Mill
- Escapement Type Cooling Bed
- Universal Type Cooling Bed
- Carry-over Type Cooling Bed
- Automatic Pack Annealing on Cooling Bed
- Four Strand Rod Mill
- Double Strand Merchant Mill
- Skew Y Reversing Tables
- Edging Mills
- Vertical Mills
- Morgoil Bearings
- Automatic Billet and Slab Separating Skids
- Electric Crop and Cobble Shear

MORGAN CONSTRUCTION CO.
WORCESTER, MASSACHUSETTS

Rolling Mills - Morgoil Bearings - Wire Mills
Regenerative Furnace Control - Ejectors - Gas Producers

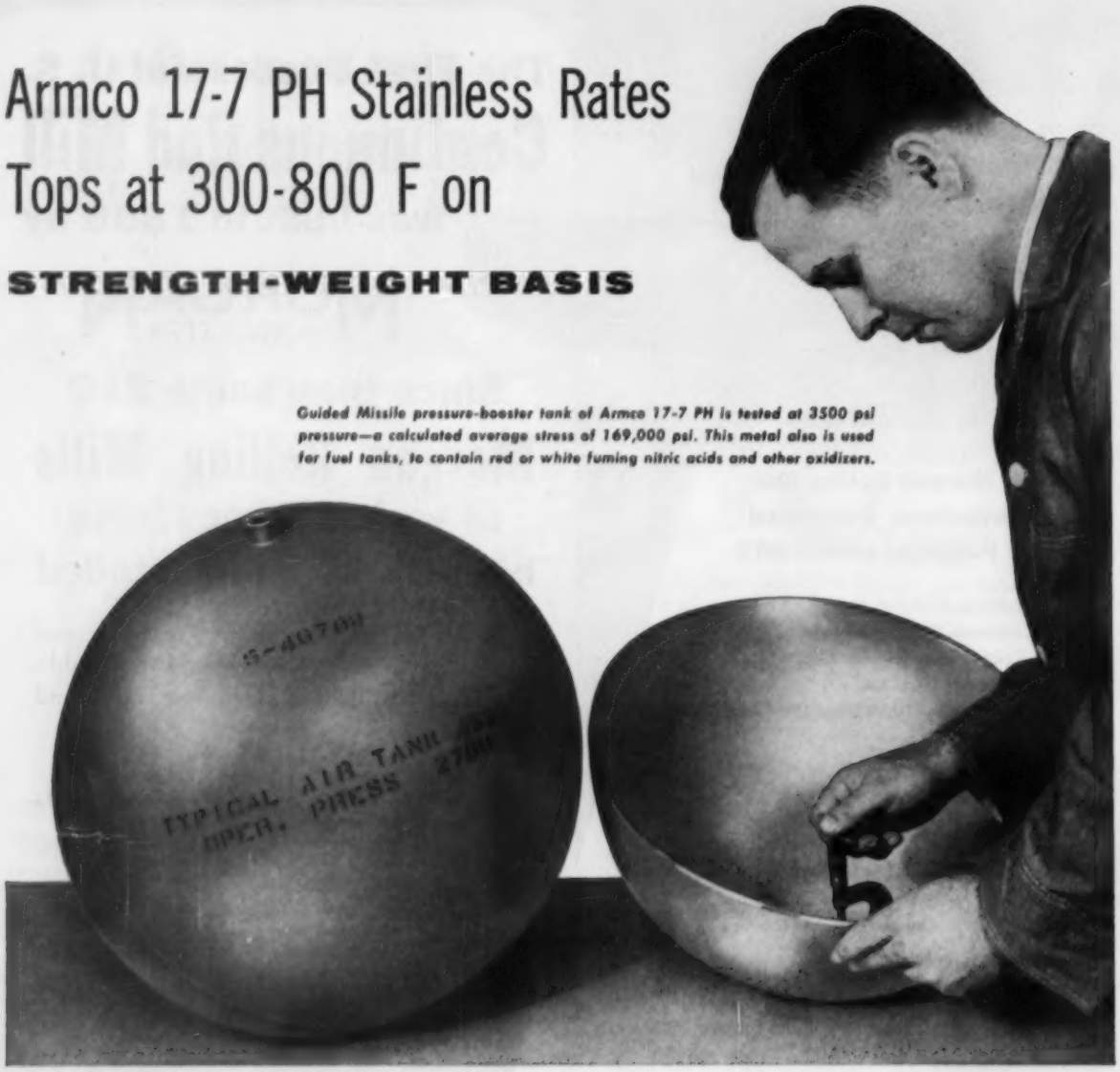
English Representative
International Construction Co., 56 Kingsway, London, W. C. 2, England

RM-39R

A Modern Morgan Mill

Armco 17-7 PH Stainless Rates Tops at 300-800 F on

STRENGTH-WEIGHT BASIS



Guided Missile pressure-booster tank of Armco 17-7 PH is tested at 3500 psi pressure—a calculated average stress of 169,000 psi. This metal also is used for fuel tanks, to contain red or white fuming nitric acids and other oxidizers.

On a *strength-weight* basis, Armco 17-7 PH Stainless Steel is unexcelled for service at temperatures of 300 to 800 degrees F. In this temperature range, Armco 17-7 PH has these pound-for-pound characteristics in comparison with the best ferrous and non-ferrous metals:

- *UNSURPASSED SHORT-TIME TENSILE STRENGTH*
- *SUPERIOR SHORT-TIME YIELD STRENGTH*
- *HIGHER STRESS-TO-RUPTURE STRENGTH*
- *HIGHER CREEP STRENGTH*

Yet Armco 17-7 PH is not a costly metal. It is well within the stainless steel price range. Besides having fine corrosion resistance, it is readily fabricated and welded in the soft condition—draws and forms much like 18-8 stainless steel. After fabrication, it takes only a low-temperature double heat treatment at 1400 F plus 1050 F to develop its high mechanical properties.

Armco 17-7 PH is supplied in sheets, strip, plates, bars, angles and wire.

For complete data, just fill out and mail the coupon.

Armco Steel Corporation, 1525 Curtis Street, Middletown, Ohio
Tell me why Armco 17-7 PH is unexcelled on a strength-weight basis for service at 300 to 800 degrees F.

Name:_____

Firm:_____

Street:_____

City:_____ Zone:_____ State:_____

ARMCO STEEL CORPORATION 1525 CURTIS ST., MIDDLETOWN, OHIO

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SHEFFIELD STEEL DIVISION • ARMCO DRAINAGE & METAL PRODUCTS, INC. • THE ARMCO INTERNATIONAL CORPORATION

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Indexed in the Industrial Arts Index and the Engineering Index.

EPA NBP

Editorial:

What's The Business Outlook?

◆ WHEN THINGS ARE good there's always a feeling they will be better. But when things are real good there is a feeling that maybe it won't last. Many businessmen think it is too good to last.

A close look at the picture doesn't support the view that we will have a falloff in business in the latter part of this year—or early next year for that matter.

This will be a year of triumphs for labor. It is in the saddle now. Because of that, labor is pushing for all it can get. That means higher prices all along the line.

But the higher prices will not cover fully the increased wage bill. There will be more absorption than in years before. That part of the increased wage bill that is not passed on will be taken care of by increased productivity.

This productivity will come from new products, new equipment, better techniques, renovation, repair, modernization, and expansion to meet new civilian needs.

The current inflation will not get out of hand. It may churn up quite a bit before the end of next year. Some people will refer to inflation as recovery. It all depends on where you are sitting. But there is no crash or sharp dip in the offing and the government can be expected to put stumbling blocks in the path of inflation.

Recovery from last year's recession is still on. Additional pressures are defense spending, railroad buying and expanded commercial building. These trends spell little or no summer letdown this year. After Labor Day comes the regular fall seasonal uplift. This year it will be heavier than usual because of the industrial momentum.

Your problem over the next twelve months will be to get supplies you want when you want them. Your other problem will be to price your goods in such a way that your firm will expand with the national growth which is now taking place at an accelerated rate.

The credit situation is giving worry to a lot of people. It may be that this factor accounts for some of the pessimistic thinking in some circles. Yet when measured against total income, inflation of the price level, rapid repayments and the small number of delinquencies, the danger sign is not yet here.

This year and next year will be big years for most of you.

Tom Campbell

EDITOR

AMERICAN MONORAIL CRANES

for smooth operation at low maintenance cost use.....

Three-ton hoist hook service extends from craneway to craneway by finger-tip controlled passage of carrier across crossover with cranes interlocked at each end.

One-ton hoist operated from crane bridge to crane bridge interlocked at crossover between craneways.

Three MonoRail cranes are interlocked to form passageway for transfer from receiving dock to steel storage area. Crane in foreground interlocks with spur track to each shear.

To handle variable loads over maximum areas, MonoRail Cranes offer smooth travel, easy movement, interlocking service between and beyond craneways, low initial cost and most important low maintenance cost. American MonoRail engineers are experienced in all phases of "up and over" handling. They are available for free consultation at your convenience.

Write for C-1 Bulletin

AMERICAN OVERHEAD HANDLING EQUIPMENT

MONORAIL COMPANY

13103 ATHENS AVENUE • CLEVELAND 7, OHIO

dear editor: letters from readers

"100 Years"

Sir:

Your 100th Anniversary Issue is certainly one of which all members of your staff can well be proud. In my opinion, it is truly a monumental work. The format too is excellent, making the wealth of material the issue contains readily available for reference purposes.

Heartiest congratulations both to IRON AGE on the attainment of its 100th Anniversary and to the present staff for the manner in which it was observed. *F. A. Lewis, The Aluminum Association, New York.*

Electronic Computer

Sir:

We have noted in the Newsfront Section of the June 2 issue mention of an electronic machinability computer recently developed which will solve in two minutes machinability problems which normally take an engineer several hours to compute.

Any information you could forward to us concerning this would be greatly appreciated. *U. H. Gillett, Metallurgist, Barber-Colman Co., Rockford, Ill.*

Details on this computer may be obtained from Carboloy Dept., General Electric Co., 11155 East Eight Mile Road, Detroit 32, Mich.—Ed.

Coil Winding

Sir:

In the June 23 issue of THE IRON AGE, your Newsfront page refers to an automatic coil winding machine capable of 3000 coils per hour, with one operator being able to operate two such machines simultaneously.

Please tell us who the manufacturer of this equipment is or where we can write for further information. *T. F. Hill, Purchasing Agent, Westclox, Div. of General Time Corp., LaSalle, Ill.*

Further information may be obtained from J. R. Reinertson & Co., 4744 West Lake St., Chicago 44, Ill.—Ed.

Corrosion Inhibitor

Sir:

We are interested in obtaining more information on the soluble vapor corrosion inhibitor mentioned in your June 9 Newsfront, p. 33. Would you give us a source? *C. B. Shepherd, Manager, Chlorine Products Div., E. I. DuPont de Nemours & Co., Wilmington, Del.*

Details on the inhibitor may be obtained from Ronco Laboratories, 3617 Brownsville Road, Pittsburgh 27, Pa.—Ed.

Anodized Coatings

Sir:

The two articles on anodized coatings appearing in the May 26 and June 2 issues of THE IRON AGE are so informative that I would like a tear sheet of each of them for my personal file. *W. H. Yake, Ass't. Staff Engineer, American Kitchens Div., Avco Mfg. Corp., Connersville, Ind.*

Welding:

Sir:

"Welding: Its Sparks Look Brighter," an article which appeared in the May 19 issue of THE IRON AGE, pp. 78-79, is of special interest to several of our readers. If available, we would appreciate your sending us two additional copies of this article. *E. Cantor, Librarian, American Steel & Wire Div., U. S. Steel Corp., Cleveland.*

Corrosion Protection

Sir:

We would appreciate receiving from you at an early date 15 tear sheets of "Electrolytic Nickel-Clad Plate Offers Low-Cost Corrosion Protection." This article is from your Oct. 28, 1954 issue. *T. J. Earley, Buyer, Badger Mfg. Co., Cambridge, Mass.*

MAXIMUM SAFETY AND WORK EFFICIENCY

NEW CONCEPT IN PRESS BRAKE DESIGN

NEW!

di-acro

Hydraulic Press Brake with STROKE CONTROL

* *STROKE CONTROL* means that you set the most practical length of stroke for each job—60 strokes per minute at ¼" stroke, 24 strokes per minute at 1½" stroke. The cam shaft does not make a full revolution as is true with flywheel driven press brakes.

Regardless of length of stroke used, *the ram speed is always constant* to insure safe, smooth, efficient operation. No violent whipping action of material.

Twelve tons of smooth hydraulic power is applied through a mechanical cam drive which assures perfect, positive alignment of bed. Ram can be "inched" or immediately backed-off. Capacity is 16 gauge steel across 36" bed. Wide variety of standard dies in stock.

For short run or experimental work use the Di-Acro hand operated Press Brake. Eight tons of power forms 16 gauge steel across the 24" bed. Uses standard dies.

See 2 Di-Acro Exhibits at Chicago Nat. 8-16 Production Eng. Show, BOOTH 125-126, Navy Pier. Metalworking Show, BOOTH 603, Chicago Coliseum.

di-acro PRECISION METALWORKING MACHINES

pronounced dy-ack-ro

O'NEIL-IRWIN MANUFACTURING CO.
302 8th AVENUE, LAKE CITY, MINN.

11 TIMES THE SERVICE

Steel mill was using rag roll as pinch roll on a shear unit. It lasted about three months on the job. Oil, heat, cutting and pressure contributing toward short life.

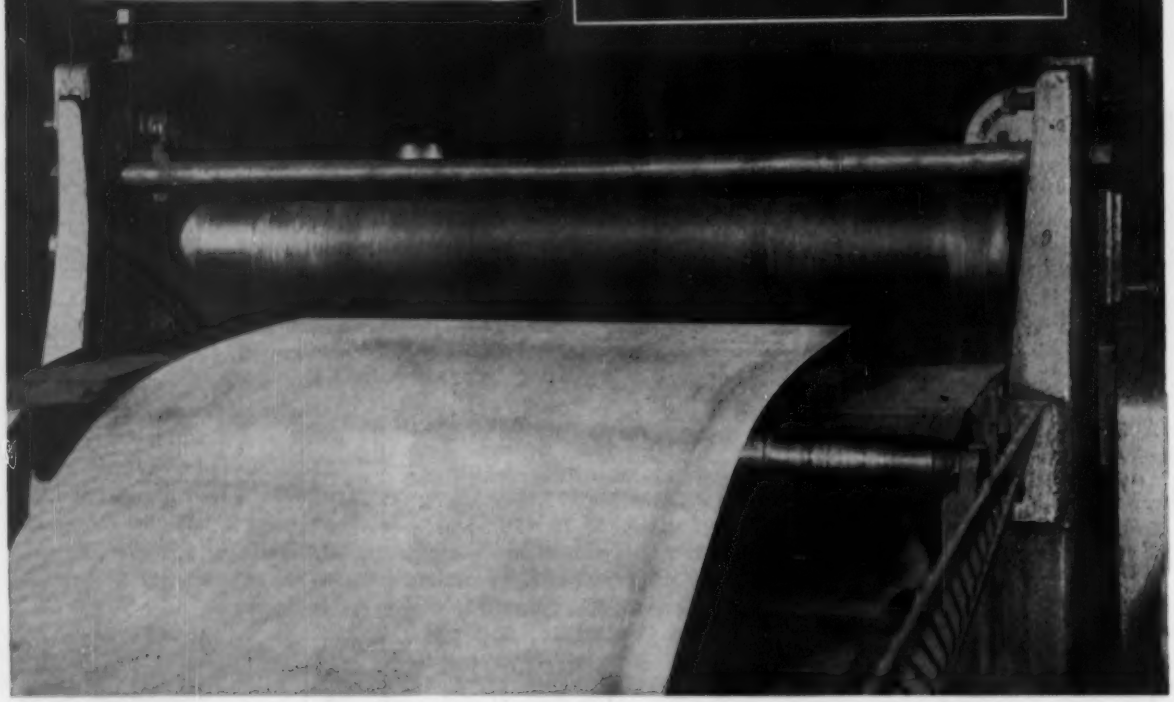
The G.T.M.—Goodyear Technical Man—recommended using a rubber-covered roll, specified compound and thickness to be used in covering the roll. This roll served 33 months—*11 times the service at a slightly lower original cost.*

Why not discuss your roll covering problems—or procurement of complete rolls—with the G.T.M., or write Goodyear, Industrial Products Div., Akron 16, Ohio.

GOODYEAR INDUSTRIAL PRODUCTS

GT-Specified TYPICAL ROLL APPLICATIONS FOR STEEL MILLS

PROCESSES	TYPES OF ROLLS	
Electrolytic Tin Line	Scrubber	Slitter
Carbon Steel Pickling	Wringer	Tension
Continuous Galvanizing Line	Pinch	Directional
Continuous Annealing Line	Hold-down	Carrying
		Coating



YOUR GOODYEAR DISTRIBUTOR *can quickly supply you with Hose, Flat Belts, V-Belts, Packing, Tank Lining, Rubber-Covered Rolls. Look for him in the yellow pages of your Telephone Directory under "Rubber Products" or "Rubber Goods."*

We think you'll like
THE GOODYEAR TELEVISION PLAYHOUSE
every other Sunday—NBC TV Network

GOODYEAR

THE GREATEST NAME IN RUBBER

fatigue cracks

by William M. Coffey

Industry Briefs

Metalworking companies are in great good luck. The Match Industry Information Bureau has invited the metalworking industry to participate in its annual match book advertising awards competition. First prize for the metalworking division is pretty Ronda Barnard shown here examining the match book of Twigg Industries of Brazil, Ind.* Second prize is a "Joshua Plaque."

Entry forms are available without obligation, upon request, from the Match Information Bureau, 500 Fifth Ave., NYC.

We are running this story in the interests of the entire metalworking industry. (For more on *Industrial Briefs*, see page 66)

Progress??

We jumped a little when we read this release from the Chesapeake & Ohio R.R.

Cleveland — Chesapeake & Ohio Railway is putting its "C&O for Progress" insignia on a "flying office car."

Walter J. Tuohy, C&O president, said today that the railroad is leasing a two-engine passenger plane from Capital Airlines for use by C&O's executive officers on business trips.

"C&O's own plane will enable our officers to cover more efficiently over 5,000 miles of railroad operations, extending from Washington, D. C., and Virginia to Cincinnati, Chicago, Michigan, Wisconsin and Canada."

The plane will be painted C&O colors, blue and yellow, and on its nose will carry the railroad's insigne "C&O for Progress."

Doubt if Capital charges them very much.

*We could be wrong.

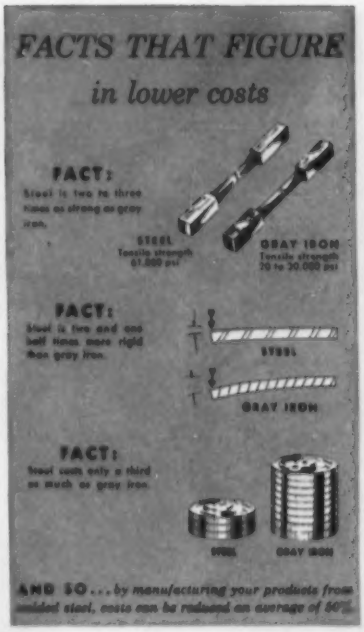
Puzzlers

From the first page of the first issue to the last page of the last issue of 15 issues of Iron Ages is 13¼" . . . not 14¾"! And the prize-takers who saw through this one are: W. B. Lobbenberg, American Nickel Alloy Manufacturing Co.; A. H. Peirce, Concord Steel Corp. (and a happy holiday to you, too); Mildred Chapman; Gene Brinkman, U. S. Steel Export Co.; Melvin Tudor, Dictograph Products, Inc.; Richard B. Hura, Youngstown Sheet & Tube Co.; John J. Day, Lone Star Steel Co.; Roy Darrell, Bell Aircraft; T. M. Connolly, Electro Metallurgical Co.; and Austin H. Phelps.

New Puzzler

A farmer said to his hired man, "This bag of feed will last our flock of chickens for 15 days; but if we had 21 more chickens and fed each chicken 2/3 as much as we are now feeding them daily, it would last only 12 days."

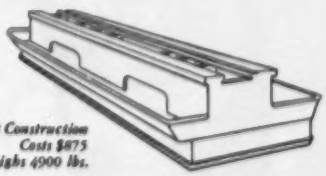
How many chickens were in the flock?



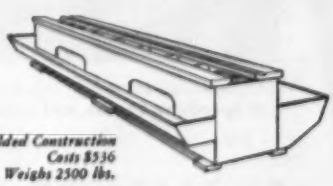
SAVES 38% ON COST WITH WELDED DESIGN

● Here is how you can apply the benefits of greater strength, higher rigidity you get with steel to your designs.

Savings of $339 are realized on this machine base by changing over from cast iron to welded steel construction. Even though 2400 fewer pounds of metal are used, the steel base is actually 40% more rigid to resist deflection under load. Result: Greater accuracy of alignment . . . at lower cost of manufacture.



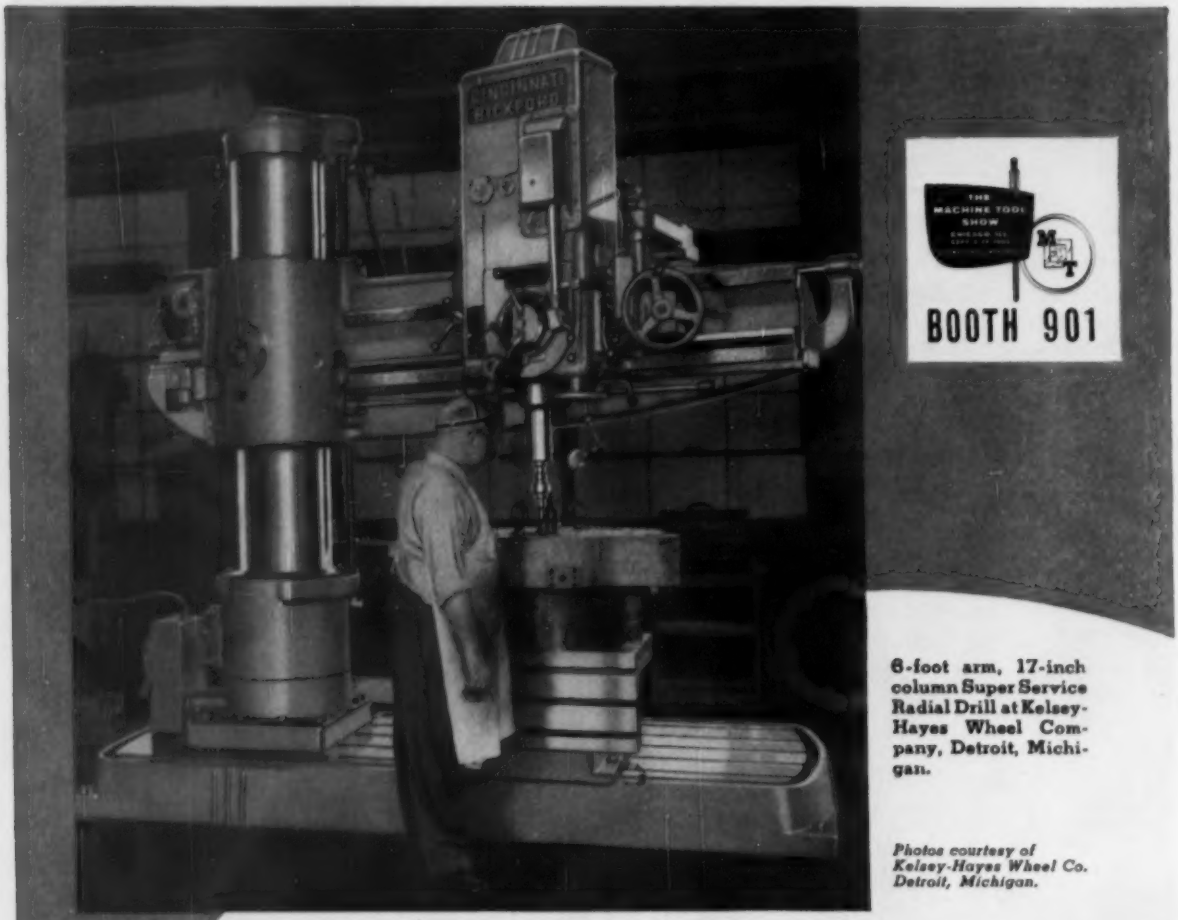
Cast Construction
Costs $875
Weighs 4900 lbs.



Welded Construction
Costs $536
Weighs 2500 lbs.

PUT THESE BENEFITS TO WORK—Ideas on designing for low cost with steel are in Lincoln WELDesign Bulletins, available to designers and engineers. Write:

THE LINCOLN ELECTRIC COMPANY
Dept. 1507, Cleveland 17, Ohio
The World's Largest Manufacturer of Arc Welding Equipment



6-foot arm, 17-inch column Super Service Radial Drill at Kelsey-Hayes Wheel Company, Detroit, Michigan.

Photos courtesy of Kelsey-Hayes Wheel Co. Detroit, Michigan.

A typical tool-room job, involving a wide range of speeds and feeds, and extreme accuracy.

"excellent

IN OUR TOOL ROOM"

The tools, dies and fixtures for the mass production of Kelsey-Hayes wheels, brake-drums and other automotive parts can only be produced on accurate machines. Since 1930 Cincinnati Bickford radial and upright drills have been used here. The machine shown above, recently installed, is rated "excellent" by this user, because of its many features for accuracy, ease of operation, safety, and productive capacity. Investigate these advantages of Super Service Radials—Write for Booklet R-29.

80 YEARS OF SERVICE

CINCINNATI
BICKFORD

RADIAL AND UPRIGHT DRILLING MACHINES

THE CINCINNATI BICKFORD TOOL CO.

Cincinnati 9, Ohio, U.S.A.

dates to remember

JULY

DROP FORGING ASSN.—Annual meeting, July 19-22, Grove Park Inn, Asheville, N. C., Assn. headquarters are at 605 Hanna Bldg., Cleveland.

TRUCK TRAILER MANUFACTURERS ASSN., INC.—Summer meeting, July 21-22, Detroit. Association headquarters are at Room 710 Albee Bldg., Washington.

AMERICAN TRADE ASSN. EXECUTIVES — Annual meeting, July 31-August 3, Grand Hotel, Mackinac Island, Mich.

EXPOSITIONS

MACHINE TOOL SHOW—Presented by National Machine Tool Builders' Assn., International Amphitheatre, Chicago, September 6-17, inclusive. This is the first industry-wide showing since 1947 of the advances in machine tools.

AUGUST

AMERICAN SOCIETY OF TRAINING DIRECTORS — 2nd Annual Institute, August 7-20, Eagle Waters Resort, Eagle River, Wisconsin.

DENVER RESEARCH INSTITUTE—4th annual symposium on Industrial Applications of X-Ray Analyses, August 11-12, University of Denver, Denver, Colo.

AMERICAN INSTITUTE OF ELECTRICAL ENGINEERS — Pacific General Meeting, August 15-19, Butte, Montana.

NATIONAL INDUSTRIAL CONFERENCE BOARD AND STANFORD RESEARCH INSTITUTE—National symposium on current "Electronics and Automation Production," August 22-23, San Francisco, California.

WESTERN ELECTRONIC SHOW AND CONVENTION — August 24-26, Civic Auditorium, San Francisco, California.

NATIONAL ASSOCIATION OF FURNITURE MANUFACTURERS — August 28-September 1, Conrad Hilton Hotel, Chicago. Showing on new products and ideas.

GENERAL MOTORS — Powerama, August 31-September 25, South Lake Shore Drive, adjacent to Soldier Field, Chicago.

SEPTEMBER

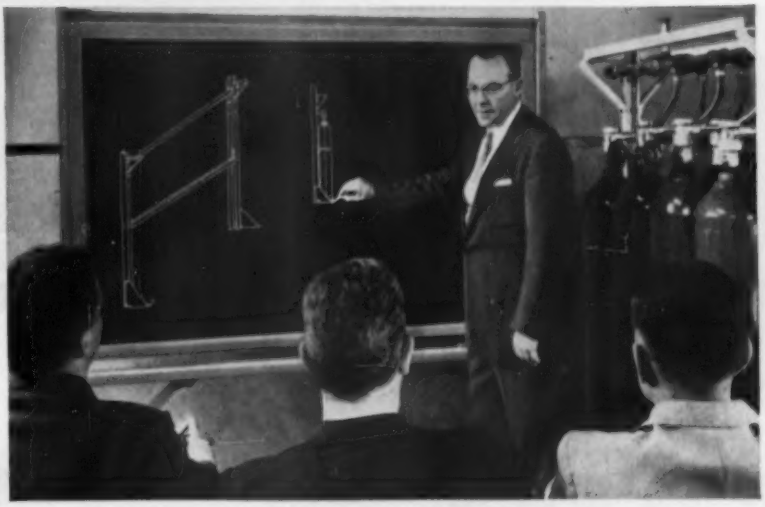
INTERNATIONAL BRIQUETTING ASSN.—Annual conference, Sept. 1-3, Stanley Hotel, Estes Park, Colo. Association headquarters are at University of Wyoming, Laramie.

AMERICAN MACHINE TOOL DISTRIBUTORS ASSN.—Annual meeting, Sept. 5-6, The Blackstone, Chicago. Association headquarters are at 1900 Arch St., Philadelphia.

INSTRUMENT SOCIETY OF AMERICA —Annual meeting, Sept. 12-16, Shrine Auditorium, Los Angeles. Society headquarters are at 1319 Allegheny Ave., Pittsburgh.

PACKAGING MACHINERY MANUFACTURERS INSTITUTE—Annual meeting, Sept. 15-18, The Homestead, Hot Springs, Va. Institute headquarters are at 342 Madison Ave., New York.

GREATEST FIRE FIGHTING DESIGN ADVANCE IN 25 YEARS!



This Kidde Automatic Pressure-Operated CO_2 Extinguishing System is *brand new from the floor up!*

✓ CHECK THESE 10 FEATURES!

☐ **1. NO FALLING WEIGHTS**—No clumsy mechanical triggering methods. Pneumatic or Electrical Control Heads automatically trigger CO_2 cylinders, assure complete discharge!

☐ **2. SELF-ENCLOSED PARTS**—All moving parts of the new Kidde system are self-enclosed to prevent fouling or accidental operation!

☐ **3. EASIER INSTALLATION**—New racking arrangement is pre-drilled at the factory, eliminates need for special hangers, tools or outside material! Can be either "free standing" or wall mount.

☐ **4. NO PARTS TO REPLACE**—Even after a fire, operating parts of the new Kidde system can be re-set with a screwdriver. No parts need be replaced. Refill cylinders and system is ready for operation!

☐ **5. SIMPLE, THOROUGH TESTING**—By merely disconnecting control heads from cylinders, *all* operating parts (other than actual discharge of CO_2 gas) can be tested *in place!*

☐ **6. QUICK VISUAL INSPECTION**—All primary actuating parts fitted with easy-to-read visual indicator. Shows at a glance if system is "set" or "released."

☐ **7. MULTIPLE PROTECTION**—Automatically-operated Directional Valves let you protect more than one hazard from the same bank of cylinders!

☐ **8. SIMPLIFIED WEIGHING**—New racking arrangement lets you weigh CO_2 cylinders right in place without disconnecting them, providing uninterrupted fire protection even while cylinders are being weighed!

☐ **9. NO OUTSIDE POWER NEEDED**—The new Kidde system is completely self-contained, has rate-of-temperature-rise detectors which give sure protection even in case of outside power failure!

☐ **10. AUXILIARY EQUIPMENT**—Also available for use with the new Kidde system are devices for turning power on or off, for opening or closing doors, windows, dampers, etc.

Fully approved by Underwriters' and Factory Mutual Laboratories.

Complete details of this revolutionary new system are contained in Kidde's Pressure-Operated System Booklet. Write for your copy today!

Kidde (K Kidde)

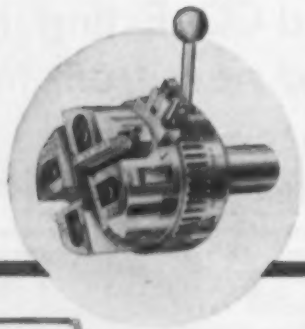
Walter Kidde & Company, Inc.
749 Main Street, Belleville 9, N. J.

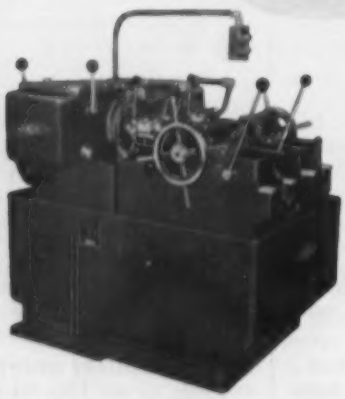
Walter Kidde & Company of Canada, Ltd., Montreal—Toronto

The words 'Kidde', 'Lux', 'Lux-O-Matic', 'Fyre-Freez' and the Kidde seal are trademarks of Walter Kidde & Company, Inc.

THE
MACHINE TOOL
SHOW
BOOTH
1406

Cutting, Grinding, Tapping,





Cutting....

The 8C LANDMACO — one of five new Thread-Cutting machines to be demonstrated. These machines are designed for precision threading of workpieces from 3/16" to 6-5/8" in diameter. Above is the new 2" LANDMATIC — one of the many Standard and Special Thread-Cutting Heads on display designed for application to Automatics and Turret Lathes.

Grinding....

The CENTERLESS Thread Grinder—to be shown in operation — for infeed and thrufeed grinding of threads for 1/16" to 4" in diameter at mass production rates.

Rolling THREADS

The latest Machines and Tools for producing threads by all of these methods will be shown—set up for operating demonstrations.

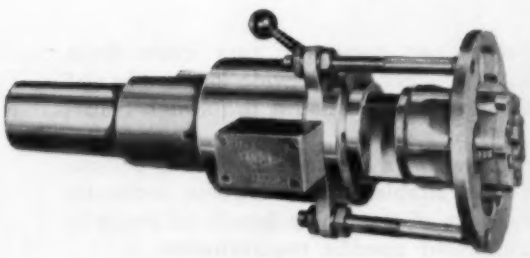
Most of these will be on display for the first time—the revolutionary LANHYROL Thread Rolling Machine, the new Model C LANDMACO Bolt Threading Machines, and the #1 Automatic Close Nipple Machine.

Experienced Thread Engineers will furnish any information desired about the more than 350 sizes and styles of LANDIS Threading Tools and Machines, and will be glad to discuss any problem dealing with method, equipment, or thread design.

LANDIS *Machine* COMPANY

WAYNESBORO • PENNSYLVANIA • U. S. A.

440-G

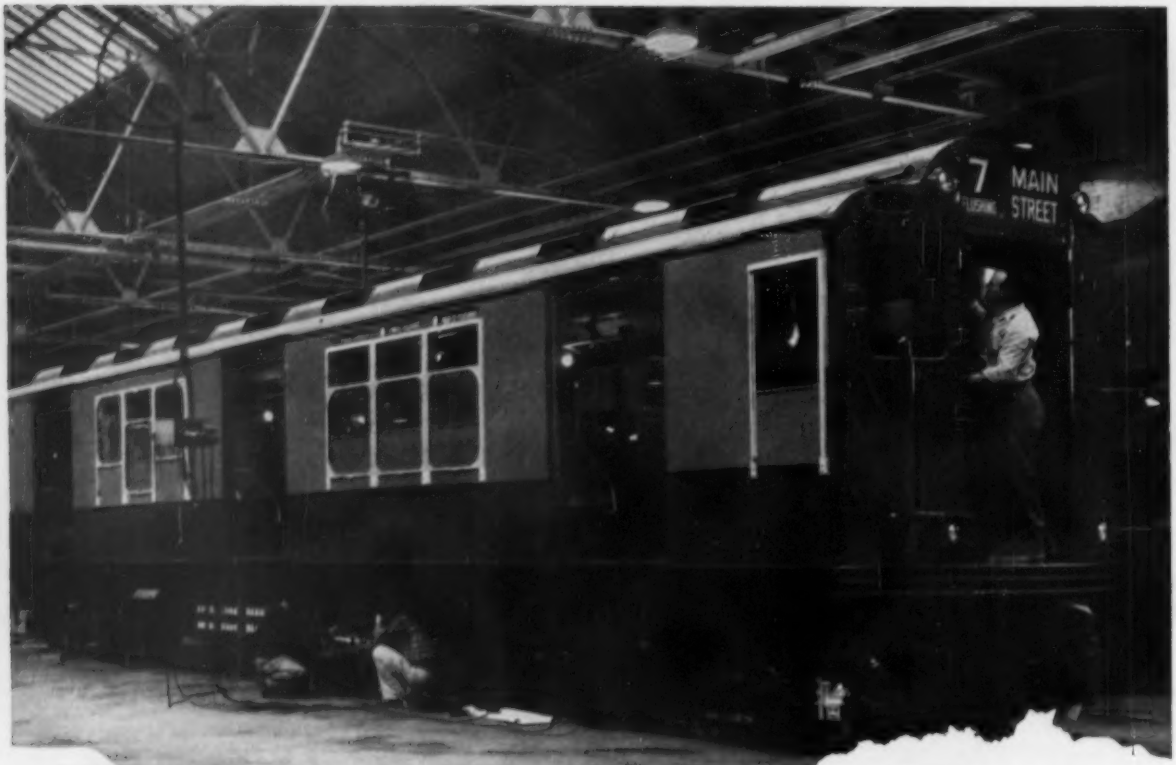


Tapping....

The LL Collapsible Tap for producing internal tapered threads featuring detachable heads for wide range coverage. On display will be Rotary or Stationary Standard Taps for straight or tapered threads, Solid Adjustable Taps, Valve Taps, and Taps for other special applications.

Rolling....

The new LANHYROL Thread Rolling Machine—shown in a variety of demonstrations—revolutionary in its output, accuracy, and flexibility. Above is the #20 LANROLL Attachment—one of five sizes of Thread Rolling Attachments for Automatics and Turret Lathes to be displayed.



Courtesy
ACF Industries

YOLOY "E" STEEL

Used in New York Subway Cars

Yoloy "E" is one of Youngstown's High Strength Low Alloy family of steels designed to cut dead weight without sacrificing strength. Thinner sections can be used with safety. Resistance to shock, vibration and corrosion is improved, thus maintenance costs are reduced.

Freight or passenger cars made from Yoloy "E" steel will provide longer life and lower operating costs due to its high resistance to corrosion.

Youngstown's Service Engineering personnel are available, at your request, to discuss the merits of the Yoloy family of steels in solving your specific requirements.

Youngstown

QUALITY YOUNGSTOWN SERVICE

THE YOUNGSTOWN SHEET AND TUBE COMPANY Manufacturers of Carbon, Alloy and Yoloy Steel

General Offices: Youngstown, Ohio - District Sales Offices in Principal Cities

SHEETS - STRIP - PLATES - STANDARD PIPE - LINE PIPE - OIL COUNTRY TUBULAR GOODS - CONDUIT AND EMT - MECHANICAL TUBING - COLD FINISHED BARS - HOT ROLLED BARS - BAR SHAPES - WIRE - HOT ROLLED RODS - COKE TIN PLATE - ELECTROLYTIC TIN PLATE - RAILROAD TRACK SPIKES

what's
new in
production
lathes?

two new Hendey lathes...

32-Speed Geared Head Lathe

This completely new lathe has a 32-speed headstock with the top eight speeds obtained through a belt drive to assure smooth finish on the work. This machine is equipped with a 15 HP motor, and spindle speeds up to 1500 RPM are available. It is designed to accommodate a 20 HP motor for spindle speeds to 2000 RPM. It can be furnished in 13", 16" and 20" sizes. Exclusive induction hardened and precision ground bed ways provide maximum accuracy and long life. Other features include 66 thread and feed changes, an independent lead screw, automatic lubrication, high-speed reversing mechanism, precision automatic stops, and heavy-duty, two-speed tail stock.

See them in action in Booth No. 221

for greater accuracy and production

No. 2E Precision Lathe

The new No. 2E Hendey Lathe is a 14" general-purpose precision lathe equipped with "Selectronic" control of spindle speeds. The electronic unit provides closer control over cutting speeds and full torque at slow speeds. It is an exclusive Hendey feature and is custom built for this lathe. Speeds may be pre-set or changed while cutting, and they are infinitely variable from 15 RPM to 1500 RPM. Low speeds are available through back gears. The spindle starts, stops, and reverses with a single lever control. Other features include dynamic braking, automatic lubrication, precision spindle bearings, and hardened and ground bed ways.

These new modern lathes are Barber-Colman's answer to any questions concerning the future of the Hendey line. They are proof of the strides we have already made and indicate the continued progress which we guarantee in the future. For years Hendey has had a reputation for accuracy. Now, new machines and features provide even closer limits of accuracy and greater production. Electronic and magnetic amplifier drives, induction hardened and precision ground bed ways, and a 32-speed geared head-stock are only a few of the new features available on Hendey lathes. See these new machines in action to determine how they can fill your production requirements.

Hendey **machine division**

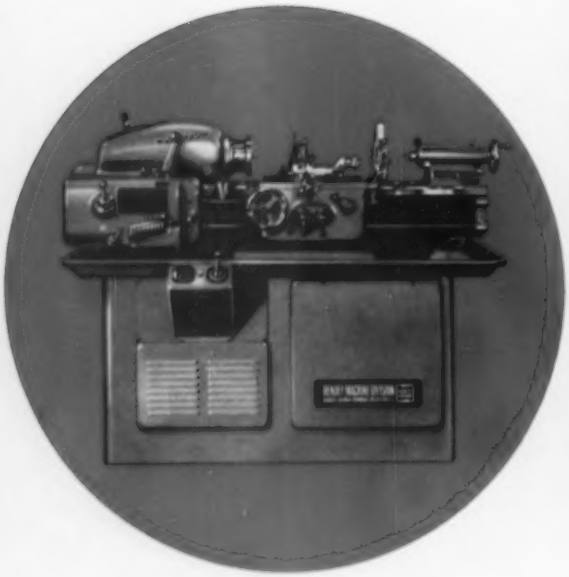
BARBER-COLMAN COMPANY

115 LOOMIS ST., ROCKFORD, ILLINOIS

BARBER COLMAN

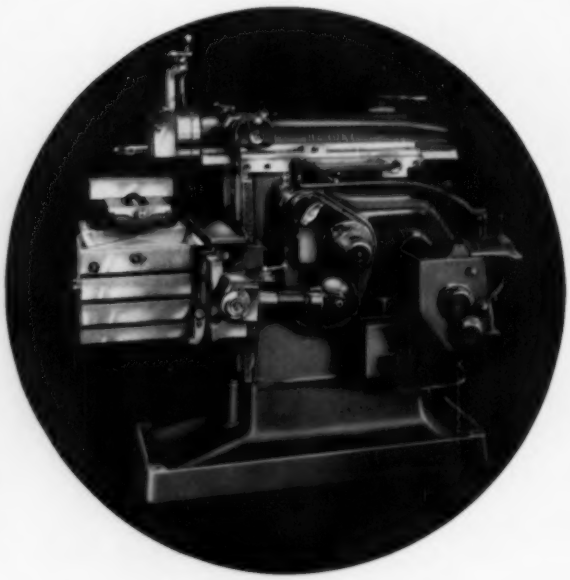
see these Hendey tool room machines

These Hendey machines are high-speed machines designed for maximum efficiency on toolroom or production work. Many new features have been added to increase their accuracy, versatility and ease of operation. We invite you to see them in action at the Machine Tool Show.



9" Tool and Gage-Makers' Lathe

Hendey 9" Tool and Gage-Makers' Lathe provides maximum precision and versatility for tool room and production use. It is available with magnetic amplifier drive for top turning efficiency. Spindle speeds range from 15 RPM to 3000 RPM with the lower speeds available through back gears. Other features include 10-1/4" swing and 24" center distance, 66 thread and feed changes, and an independent lead screw.



12" Crank Shaper

Hendey 12" Crank Shaper is a high-speed machine designed with maximum cutting power and flexibility in a wide range of work. Constructed especially for precision work, the machine is standard with universal table and vise for positioning the work to any angle. Full standard equipment also includes dual mechanical controls, automatic lubrication, quick-change swivel head and adjustable preloaded Timken bearings on the crank gear.

Hendey **machine division**

BARBER-COLMAN COMPANY

115 LOOMIS ST., ROCKFORD, ILLINOIS

BARBER COLMAN

Chromewear

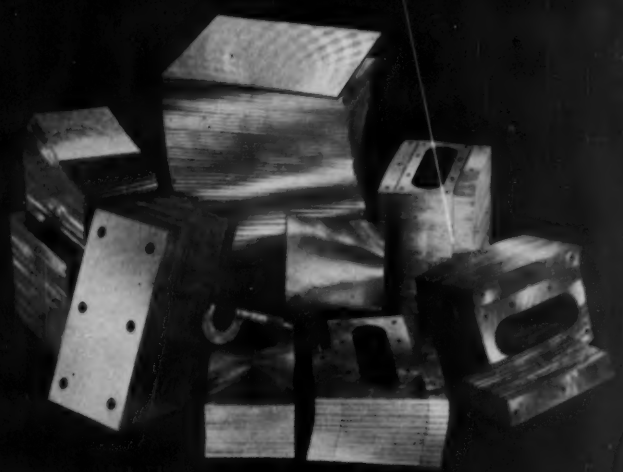
for the really tough abrasive jobs*

U. S. Patent 2,174,818

HIGHEST ABRASION-RESISTING STEEL

Independent laboratory tests have shown that CHROMEWEAR has abrasion resistance more than 30 times that of 1% carbon tool steel and 6 times that of high carbon-high chromium tool steels. No other known steel exceeds CHROMEWEAR in this respect. Wherever maximum wear resistance is required, with machining kept to a minimum, CHROMEWEAR is your outstanding choice. Typical uses are brick mold liners, liners for sand blast machines and sand slingers, drawing dies, ceramic molds, extrusion dies for ceramics. There is a Vanadium-Alloys Steel Company office near you for consultation and the prompt handling of your inquiries.

*brick mold liners, for example



No other steel has outperformed CHROMEWEAR for brick mold liners

made by the originators of High-Vanadium Steels

VANADIUM-ALLOYS STEEL COMPANY was first to produce 18-4-1 and 18-4-2 high speed steel, first to produce M-2, M-4 (Neatro) and T-15 (Vasco Supreme) high-Vanadium high speed steels—all nationally known for first quality performance over a wide range of applications.

VANADIUM-ALLOYS STEEL COMPANY

Manufacturers of First Quality Tool and Die Steels

Latrobe, Pennsylvania

COLONIAL STEEL DIVISION • ANCHOR DRAWN STEEL CO.

In Canada:

Vanadium-Alloys Steel Canada Limited, London, Ontario

NEW

FRONT-TO-BACK CRANKSHAFT DESIGN

embraces numerous operating and structural improvements

Of far reaching importance, the development of Niagara's impressive, new Styleline Deep Throat Presses has opened the way to numerous operating and structural advantages. Barriers imposed by conventional side-to-side crankshaft arrangements and outmoded end wheel designs have been shattered. The Niagara-developed front-to-back crankshaft design introduces a new concept of deep throat press performance and economics:

MODERN, SPACE-SAVING, ENCLOSED CONSTRUCTION

The entire driving mechanism is within the limits of a compact, all-steel frame. There are no exposed, overhanging parts and mechanisms to obstruct crane service, block light, throw grease and consume floor space unnecessarily.

LONGER DIE LIFE, GREATER ACCURACY

Increased distance between gibs makes possible a wider slide (left to right) for greater support to wide dies. Longer gibs assure accuracy for the full stroke.

MINIMIZED SHAFT DEFLECTION AND GEAR WEAR

With all gears located inside the press frame and overhung bearings eliminated, damaging shaft deflection is held to a new minimum. Both pinion and gear are more rigidly supported to withstand maximum loading with minimum wear.

PROLONGED GEAR AND CLUTCH LIFE

Gears and clutch members, all neatly housed in the crown, operate in sealed baths of oil to assure longer service life.

Built in a large range of sizes and throat depths, these modern, Styleline Series C Presses reflect the latest thinking of Niagara engineers . . . today as always, pace-setters in power press advancement.

HERE'S THE WHOLE STORY ON WHAT THESE MACHINES CAN DO FOR YOU

Get all of the facts. Check the specs! Write for new, illustrated Bulletin 61 today. It will be mailed promptly without obligation.

NIAGARA MACHINE & TOOL WORKS • BUFFALO 11, N. Y.

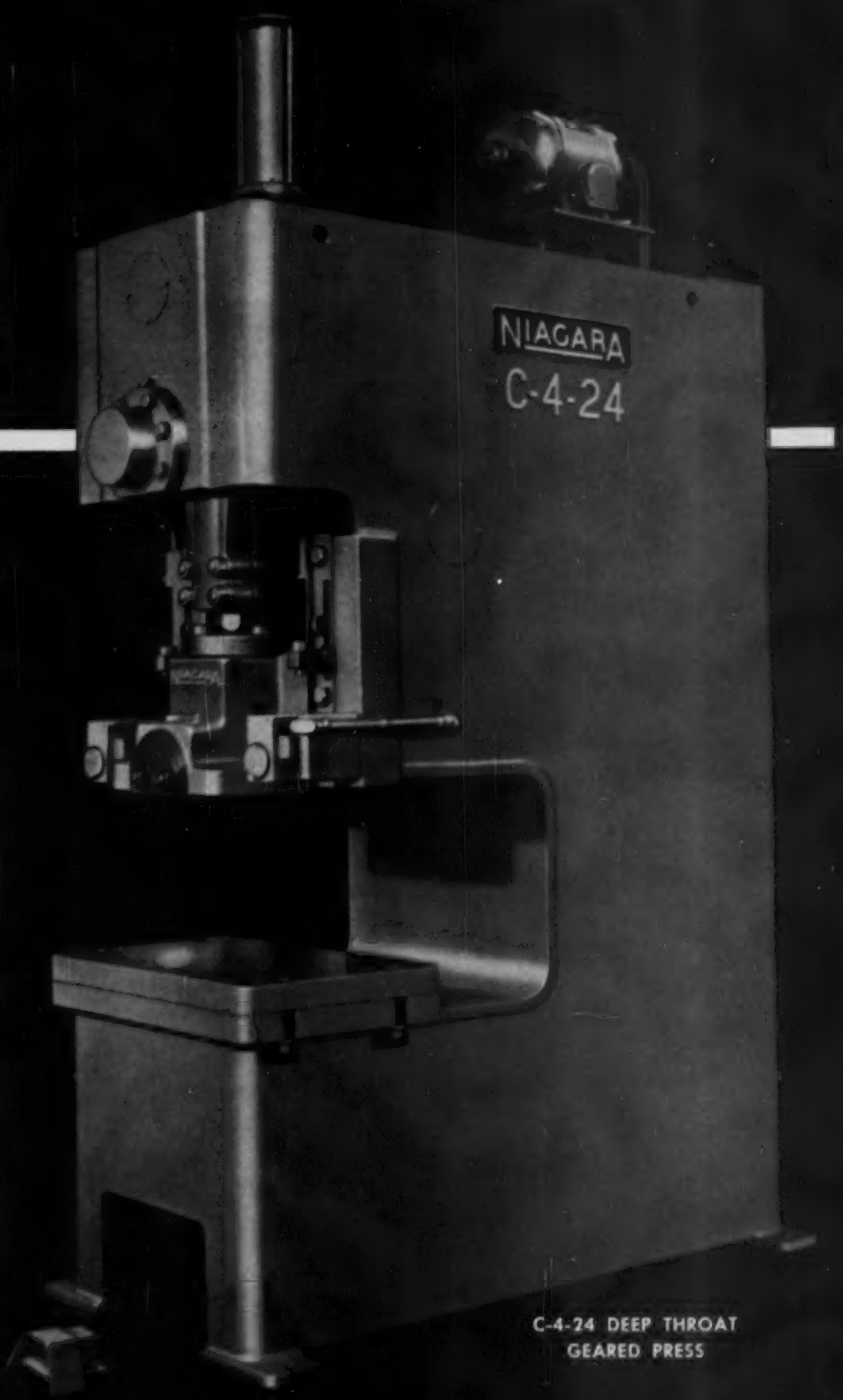
DISTRICT OFFICES:

Buffalo • Cleveland • Detroit • New York • Philadelphia

Dealers in principal U. S. cities and major foreign countries

NIAGARA

America's Most Complete Line of Presses, Shears, Machines and Tools for Plate and Sheet Metal Work



C-4-24 DEEP THROAT
GEARED PRESS

Air counterbalance offsets weight of slide, die and connections.

No overhanging motor, belts, flywheel, brake, shafts nor other mechanisms.

Front-to-back crankshaft (heavy, forged, high carbon steel) enables fully stylelined, enclosed construction.

Multiple V-Gibs assure maximum die life.

Unusually long slide and stiff, channel section eliminate deflection of guiding ways, increasing die life. (J.I.C. flanged slides available.)

Large range of throat depths accommodates tremendous variety of work.

Rugged, all-steel, box type frames stress relieved in a furnace and grit blasted before machining.

Foot switch optionally available for clutch control.

Readily equipped with pneumatic die cushions for drawing operations.

Exclusive electro-pneumatic clutch on all geared models. Famous mechanical sleeve clutch on all plain, non-geared models.

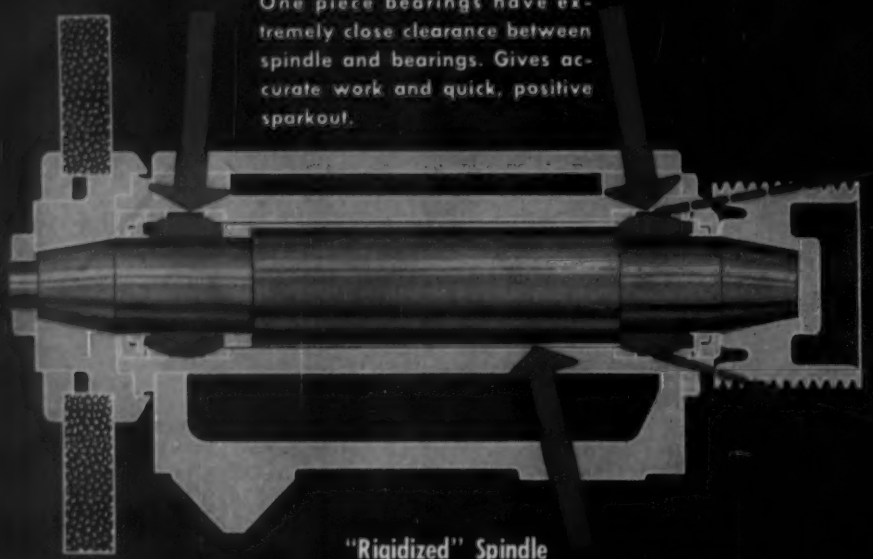
STYLELINE DEEP THROAT PRESSES

Only Landis grinders have "rigidized" bearings and spindles

for
- maximum production
- fine finishes
- high precision

"Rigidized" Microsphere Bearings

One piece bearings have extremely close clearance between spindle and bearings. Gives accurate work and quick, positive sparkout.



"Rigidized" Spindle

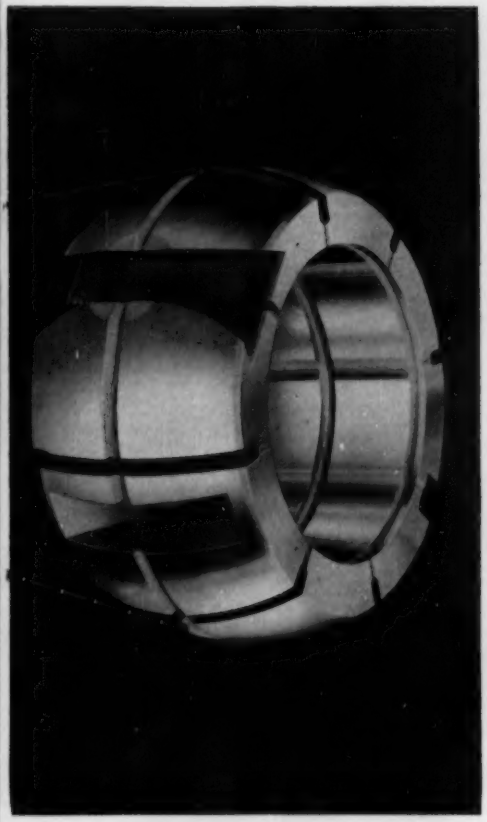
Because the diameter of the spindle between bearings is increased, you can take heavy cuts without loss of accuracy or finish.

LANDIS

precision grinders

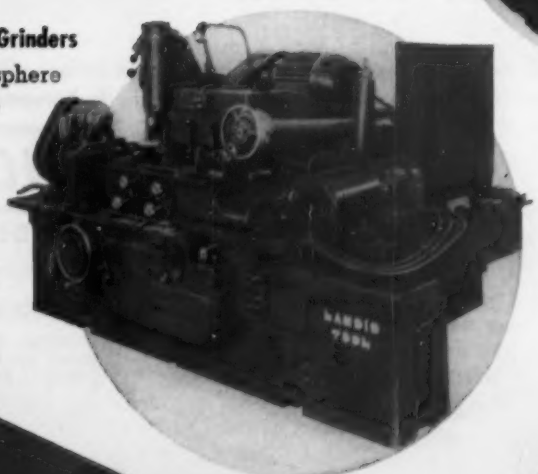
LANDIS TOOL COMPANY / WAYNESBORO, PENNA., U. S. A.

Landis Universal Grinders have rigidized Microsphere bearings and spindle.



Landis Plain Grinders have rigidized Microsphere bearings and spindle.

Landis Centerless Grinders have rigidized Microsphere bearings and spindle in both the grinding wheel and regulating wheel heads.

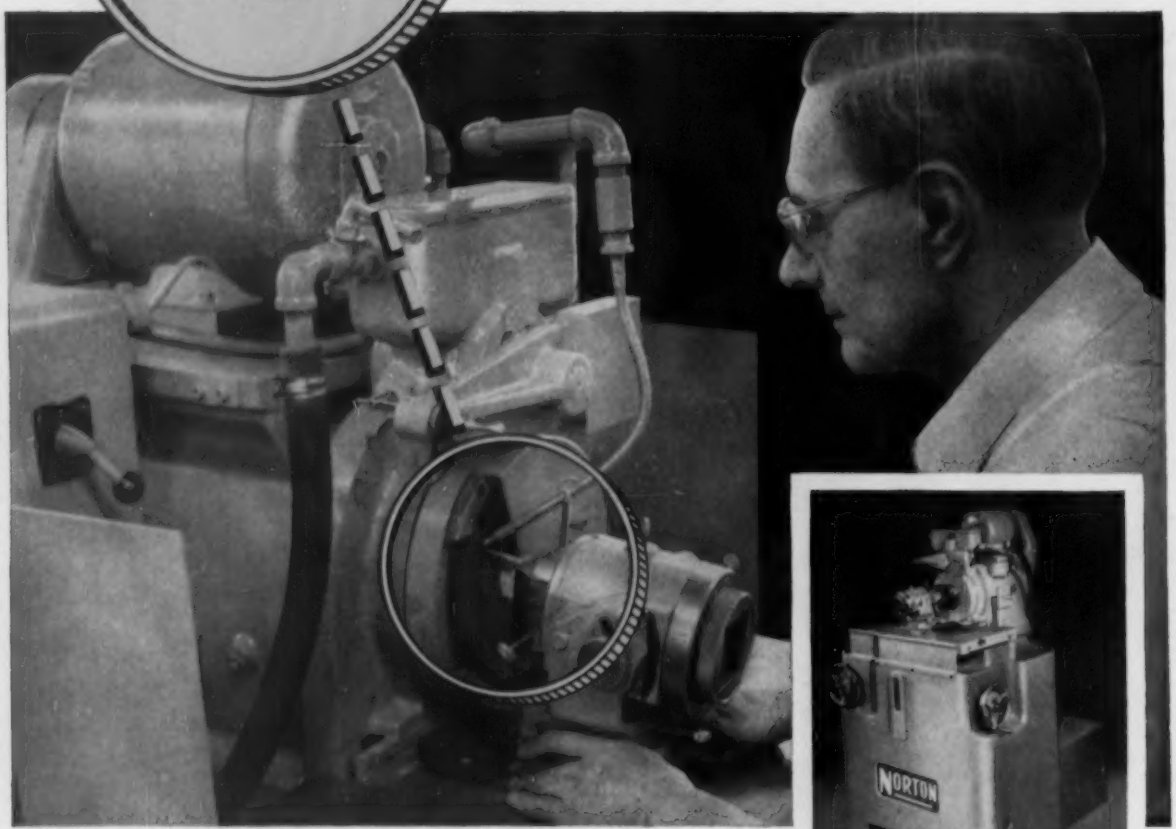


Landis Single-Purpose Grinders have rigidized Microsphere bearings and spindle.

Unequalled

for carbide tool sharpening, the Norton No. 2 Bura-Way Grinder...

makes tools last longer



BURA-WAY does it better. This Norton Tool Grinder for convex single point and form tools: (1) generates, reproduces and maintains relief angles *constant in the direction of feed*, providing uniform support to the cutting edge and; (2) insures exact duplicates of the master tool form.

When your operator sharpens your carbide-tipped tools on the Norton No. 2 BURA-WAY Grinder he adds longer life value to these tools, helping you to make more profit and turn out better products for your customers.

Precise Duplicates Every Time

In the BURA-WAY No. 2 you have the ideal tool grinder. The BURA-WAY method increases tool life and gives you more pieces per sharpening. By exact duplication of the master tool, tremendous additional benefits may be realized from an effective tool control system and reduced set up time when changing tools.

Find Out More

Get in touch with your Norton representative whose knowledge and experience is further supplemented by Norton trained engineers. Only Norton offers you such long experience in both grinding machines and wheels to help you produce more at lower cost.

Write NORTON COMPANY, Machine Division, Worcester 6, Massachusetts.

To Economize, Modernize With NEW

NORTON

GRINDERS and LAPPERS

Making better products... to make other products better

District Sales Offices
Hartford • New York • Cleveland • Chicago • Detroit
In Canada: J. H. Ryder Machinery Co., Ltd., Toronto 5

A new concept in . . .

instrument adaptability

WITH SPEEDOMAX® H

● Whether you melt metal, refine chemicals or bake bread, there's a Speedomax H available for the job.

For this complete line of electronic temperature instruments is being quantity-produced from a series of standard, integrated components.

Null-balance potentiometer indicators or indicating recorders . . . with either round or strip charts . . . can be combined with the type of control action best suited to your process needs. Whether you need simple or multiple action control . . . instrument and control components come to you as one integral unit.

And all proportioning control chassis are interchangeable. You can select the instrument to fit your process now, and at any time modify it to meet new conditions . . . quickly and economically.

To see the features of this unique instrument, get our pictorial fold-out which takes you inside Speedomax H. Just phone your nearest L&N office or write us at 4956 Stenton Ave., Phila. 44, Pa. Ask for Die-Out ND46(1).

LEEDS NORTHRUP
instruments automatic controls • furnaces

Jrl Ad ND46(25)

In Industry...

DELCO

preferred

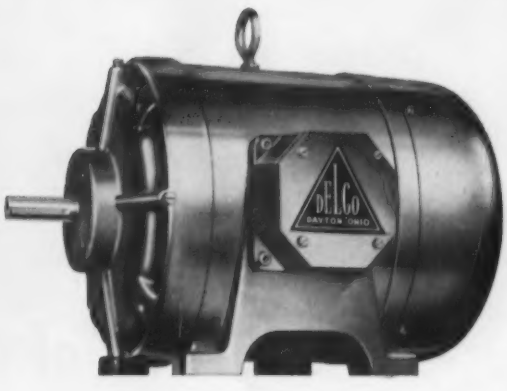
Delco integral motors at work on heavy industrial grinder.

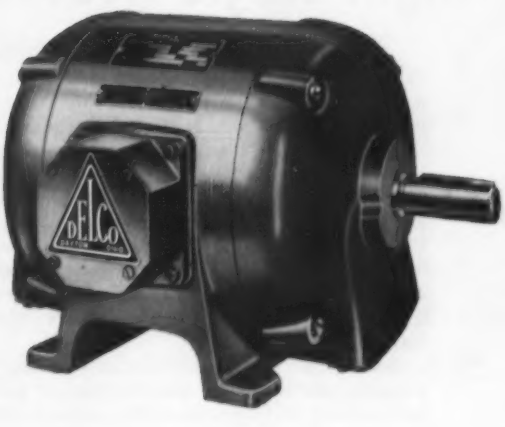
From fractionals through large integrals, Delco electric motors are designed specifically to meet *your* requirements. They assure top performance and dependability on any job.

Delco engineers work closely with *your* engineers to fit each motor to the particular job you want it to do. Each Delco motor then is built to one rigid quality standard, and subjected to exhaustive tests all along the production line.

★ ***See Delco electric motor national advertising in The Saturday Evening Post for the story of the full Delco electric motor line.***

DELCO
DAYTON OHIO





With this quality control, Delco motors perform better, stand up longer, cost less to maintain.

That's why, for almost every industrial need and product application, you will find Delco preferred. And wherever Delco motors go to work, Delco parts and service aren't far away.

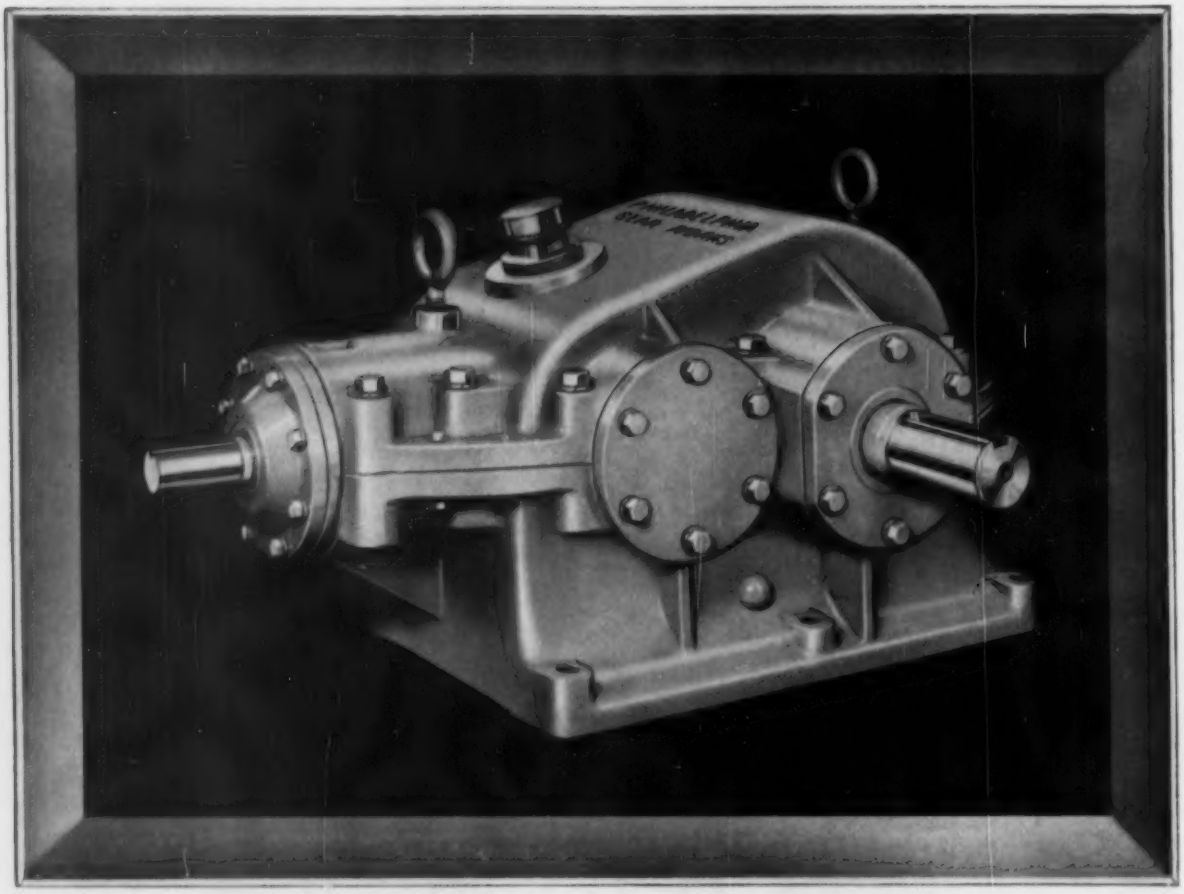
Your request for further information will receive a prompt reply.

GM GENERAL MOTORS DELCO

DELCO *Electric* MOTORS

DELCO PRODUCTS, DIVISION OF GENERAL MOTORS, DAYTON, OHIO

Proved best by Performance!



Portrait of a Darned Good Right Angle Reducer by *Phillie Gear*

There are many qualities of design and construction which are not apparent from a "portrait" of a Philadelphia Spiral Bevel Reducer . . . for instance: High Speed Gearing consists of precision generated spiral bevel gears which are hardened, lapped, and ground, so that tooth contact is exactly right for many years of durable and quiet operation. The low speed or output gearing is hobbed and finally shaved to provide absolutely correct tooth dimensions and a fine surface finish. Here again, long and quiet gear life is engineered into Philadelphia Speed Reducers.

Housings are amply proportioned for rugged strength, heat radiation, and symmetrical gear arrangement. Bearings and shafting in every case are designed for overloads of at least 100%.

Philadelphia Spiral Bevel Reducers are available in a standardized line of housing sizes and gear ratios; however, every unit is "custom built" to your requirements and specifications. Changes from our standard line are gladly and economically made to suit your particular mounting and shafting arrangements.

Both horizontal and vertical types are available in single, double, triple reductions, with standard ratios ranging from 1:1 up to 238:1. Operating efficiencies run as high as 98%.

Where smooth, reliable, and continuous power transmission is required—a Philadelphia Spiral Bevel Reducer will do the job better and more economically.

For detailed information, write for catalog SB-50.

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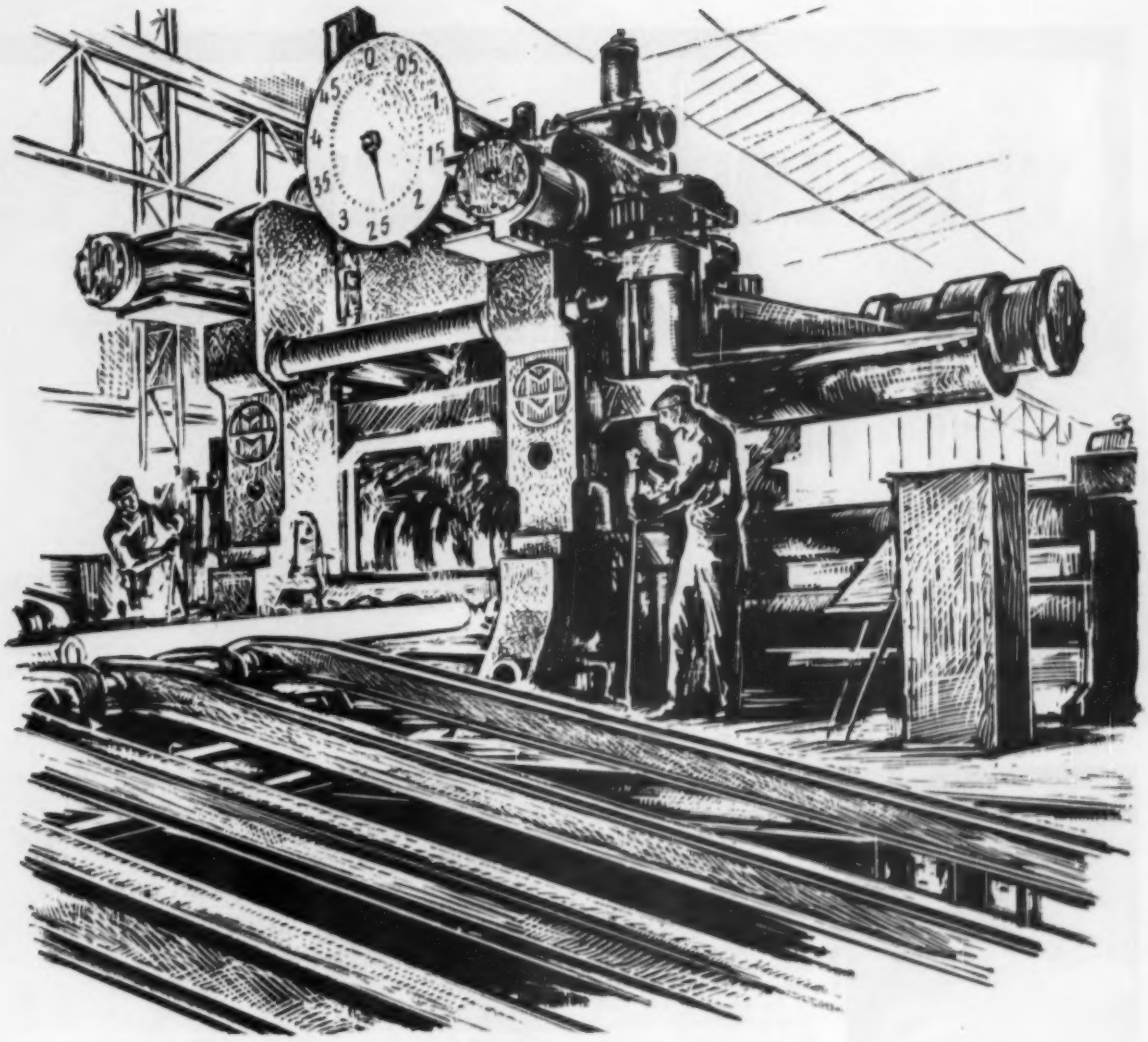
Industrial Gears & Speed Reducers

LimiTorque Valve Controls

Established 1892



More and Better Seamless Pipe from Newest Automatic Mills

High operating rates of more than 3 pieces per minute of 45 feet long seamless pipe are attainable with Mannesmann-Meer's latest automatic plug mill design.

Besides this high production capacity, new and outstanding developments in mill and mandrel bed design feature extremely quick schedule changeover to cut costly downtime.

More than 65 years of unmatched experience in mill operation and mill design puts us into a position to offer you a combination of

- CREATIVE ENGINEERING
- DESIGN EXPERIENCE
- OPERATING BACKGROUND
- AMERICAN MANUFACTURING SKILL

which is nowhere else ready to go to work for you.

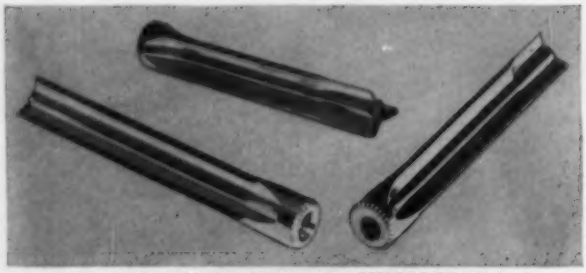
MANNESMANN-MEER

ENGINEERING AND CONSTRUCTION COMPANY, 900 LINE STREET, EASTON, PENNA

WORLD SPECIALISTS IN HIGH-SPEED TUBE MILL MACHINERY

WIDE ENDURO BELT ...keeps scratches off bandages

CORROSION RESISTANCE IN TUBULAR FORM. Republic's Steel and Tubes Division turns out miles of ENDURO Stainless Steel Tubing for the process industries and for mechanical applications. Republic ELECTRUNITE Stainless Steel Tubing and Pipe offer the identical high mechanical and corrosion-resisting properties demonstrated in sheet form by the Reynolon belt. Call Steel and Tubes for application assistance on all your fluid handling and tubing problems.



WHAT'S EVEN MORE CORROSION-RESISTANT? REPUBLIC TITANIUM. Titanium surpasses even stainless steel in resistance to many severe forms of corrosion. Yet, it weighs only 56% as much as alloy steel. Here, Republic Titanium supplies corrosion-resistance and lighter weight to parts designed to knit human bones. Republic Titanium and Titanium alloys now are available for civilian applications. Republic has the experience to help you use them best. Write us.

REPUBLIC STEEL

REPUBLIC STEEL CORPORATION
3104 East 45th Street,
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I'm interested in additional information on:

- ☐ Republic ENDURO® Stainless Steel
- ☐ Stainless Metallurgical Assistance
- ☐ ELECTRUNITE® Stainless Steel Tubing
- ☐ Republic Titanium
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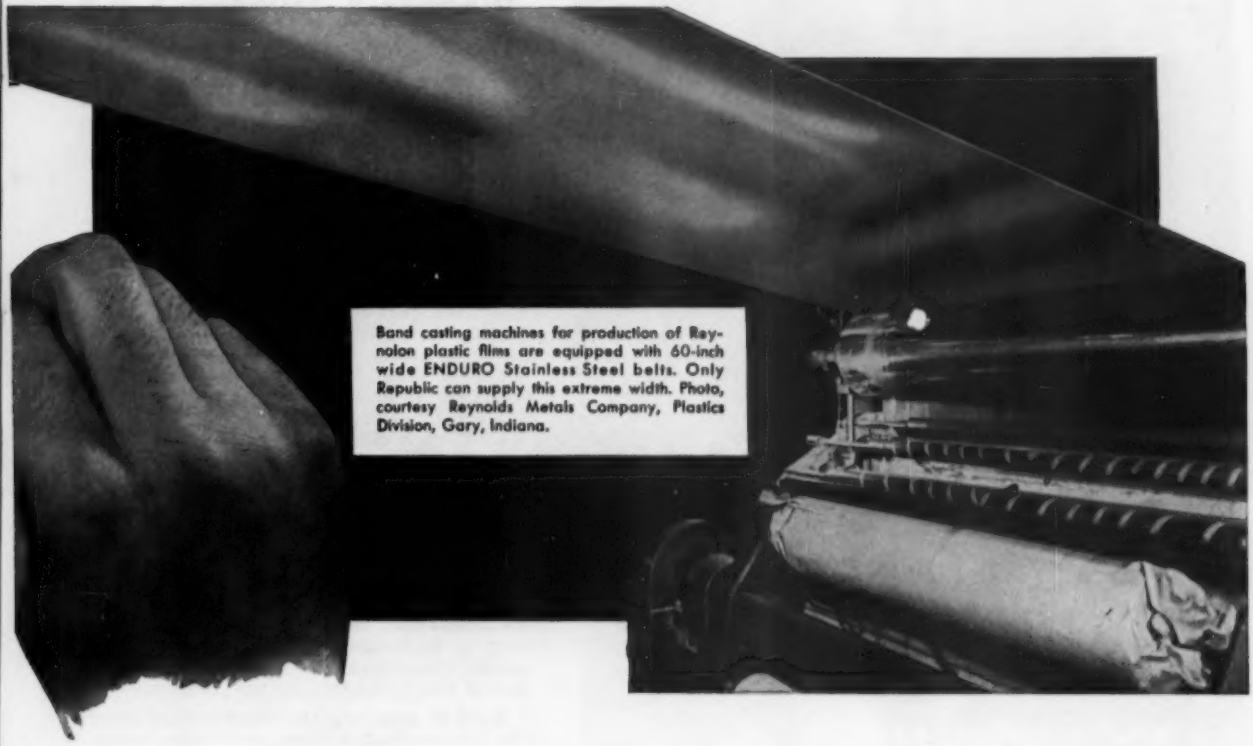
NO CONTAMINATION — NO SPOILAGE. Republic Steel offers a full range of barrels, drums and pails in a variety of metals and finishes to protect your chemical, food and other products. Choose from ENDURO Stainless Steel, hot dipped galvanized steel, hot dipped tinned steel, mill galvanized sheet steel, hot rolled open hearth steel, plain or lacquer lined. Choice of gages to meet all handling and shipping requirements. Many styles in sizes up to 55 gallons. Contact Republic.



Band casting machines for production of Reynolon plastic films are equipped with 60-inch wide ENDURO Stainless Steel belts. Only Republic can supply this extreme width. Photo, courtesy Reynolds Metals Company, Plastics Division, Gary, Indiana.

This wide, polished ENDURO Stainless Steel belt carries Reynolon plastic coatings in process. One such type makes the peel-off backing for those handy packaged small bandages you use.

The ENDURO surface provides a high luster finish! Since the slightest scratch would be "mirrored" or duplicated in the finished product, the quality of the stainless steel surface determines the quality of the plastic coating. Here, ENDURO keeps scratches off bandages!

Note that the belt is supported only by top rollers. That allows both sides to carry the plastic material . . . speeds production. It also means that the belt must have great tensile strength. ENDURO supplies that strength. In this case, tension on the belt runs as high as 90 tons.

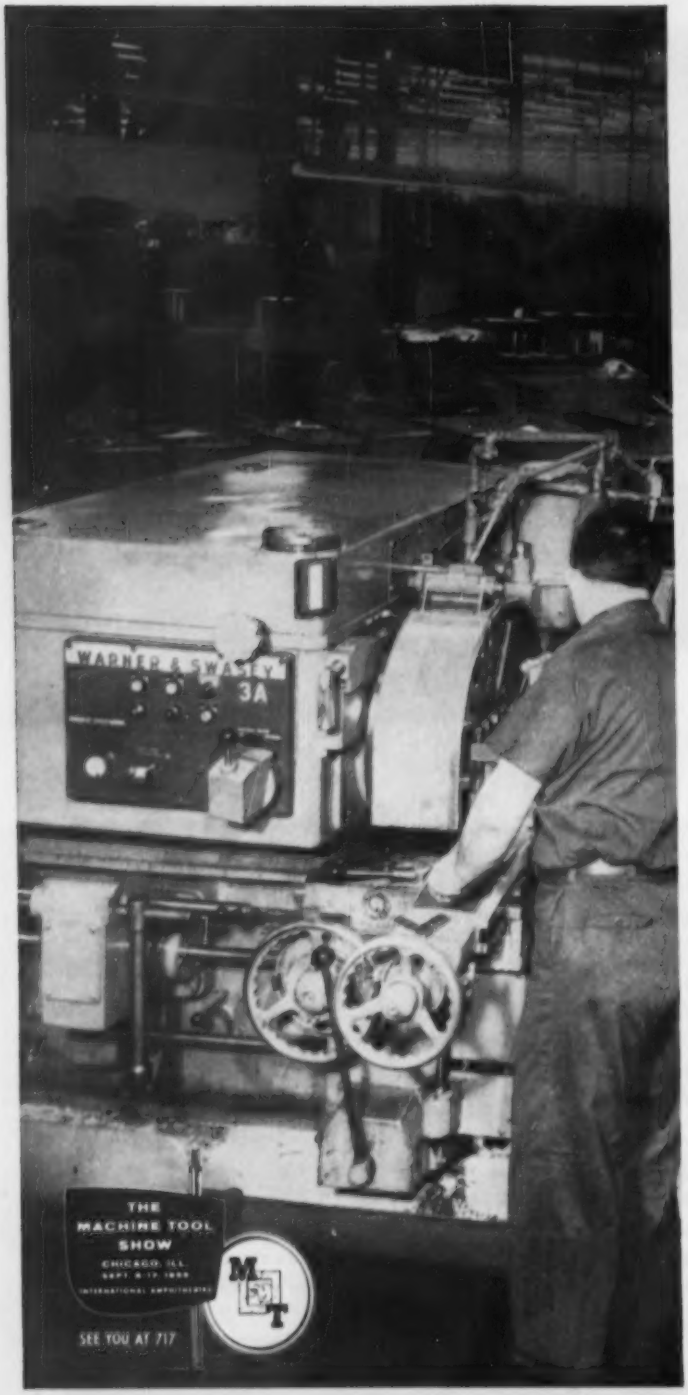
What's more, this belt must be heat-resistant. In process, material passes through 600° ovens. And, many of the plastics processed are in hydrous or acidic solutions. So, the belt must resist rust and corrosion. ENDURO does just that.

Four of these sixty-inch wide belts help produce Reynolon plastic film. Even at this extreme width, the belts must stay flat. "Crowned" metal could snap like an oil can and damage the plastic.

Republic metallurgists worked closely with Reynolds Metals Company, Plastics Division, to develop this unusual equipment. If you have process or product problems involving heat, corrosion, surface finish or strength, ENDURO Stainless Steel quite likely is your answer. Republic metallurgists will help you apply it most profitably. Write Republic.

REPUBLIC STEEL

World's Widest Range of Standard Steels and Steel Products



Warner & Swasey 3-A's show 5-way production gain for Goss!

Goss Printing Press Co. selected two new Warner & Swasey 3-A's for small-lot, high precision printing press parts. These machines, part of their dynamic replacement program, replaced two 1941 turret lathes. Goss accuracy requirements are high, for giant roll presses must print up to 2,000 feet of paper per minute—and the only guide for this ribbon of paper is the parallelism of the rolls to each other.

Here are the performance factors that Goss reports speeded production and added up to *30% savings* from their new Warner & Swasey installation:

More speeds quickly available in their working range. Because of Goss' small lot production, averaging about 10 pieces, work diameters vary from small ¾" bores all the way up to maximum machine chucking capacity. 32 easily-obtained speeds permit selection of the right speed for the particular cut.

Built-in accuracy and rigidity eliminated the non-productive time previously necessary for inspections to maintain specified tolerances. Now entire lots are run with only spot checks after the first piece. They bore 3½" diameter sleeves 12" long to within a .0005 end-to-end taper tolerance, and within .0005 total tolerance on the bore! Previously such bore tolerances required reaming.

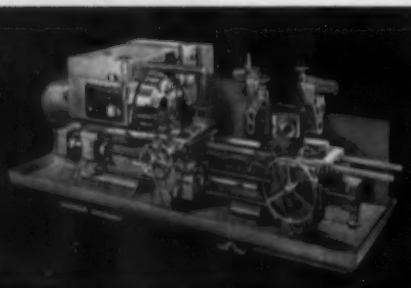
Higher top speed of 851 rpm. and **increased horsepower** now permit running all jobs, even smaller work diameters, at recommended surface speeds of 400 surface feet *and higher!* More combined and multiple cuts are also possible.

Handling ease of the new 3-A's has them all talking at Goss! They praise the new automatic headstock, with its shifting ease and direct reading preselector dial; the time and effort saved by the power chuck wrench; the single lever rapid traverse on the cross slide apron, and the zoned controls.

That's the Goss report. If you've read "between-the-lines" production advantages for *your* shop, see our Field Engineer for more facts!

NEW EXTRA-HEAVY DUTY SADDLE TYPE TURRET LATHES

1-A UNIVERSAL
2½" or 3" Bar Capacity, 16¼" Swing
2-A UNIVERSAL
3½" or 4½" Bar Capacity, 20" Swing
3-A UNIVERSAL
4½" or 6" Bar Capacity, 23½" Swing
4-A UNIVERSAL
9" or 12" Bar Capacity, 28¼" Swing



75TH ANNIVERSARY YEAR
WARNER & SWASEY
Cleveland
PRECISION MACHINERY
1880 — 1955

YOU CAN PRODUCE IT BETTER, FASTER, FOR LESS...WITH A WARNER & SWASEY

Platypus
ORNITHORHYNCHUS ANATINUS

Versatile

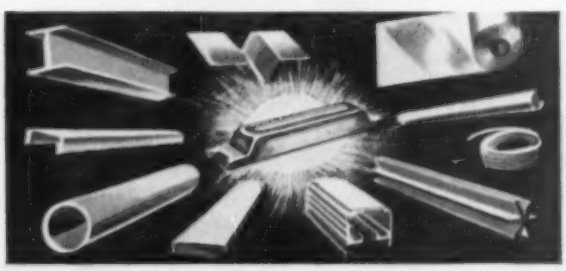
One of nature's most versatile creatures is the platypus, found in Australia.

This curious creature has the bill and broad webbed feet of a duck. It lays eggs that resemble the eggs of a reptile. The male can secrete a poison which is similar to that produced by a venomous snake. The body of the platypus is covered with fur as thick as that of an otter. It digs a den with a tunnel entrance under water and an air shaft on land. The platypus swims like a fish, yet suckles its young like a mammal.

One of industry's most versatile materials is aluminum. At an accelerating pace, industry is developing new fabricating methods for aluminum—methods never before used with structural metals. These new methods are being applied to economically fabricate products embodying aluminum's advantageous and versatile characteristics.

Today we have inexpensive aluminum collapsible tubes, light corrosion-resistant construction materials, low-resistance electrical conductors. Tomorrow, today's new fabricating techniques will provide rigid aluminum containers, more aluminum in transportation, in electrical equipment and in a multitude of other products.

Aluminium Limited Sales, Inc. is the distributor in the United States for aluminum from Canada. Why not investigate making your products of aluminum?



Versatile

In the form of sheet, plate, tube, rod, pipe, wire, bar, extruded shapes, architectural and structural sections—aluminum is growing faster in number of uses than any other metal.

ALCAN
Aluminum *from* Canada

Aluminium Limited Sales, INC.
630 FIFTH AVENUE • NEW YORK 20, N. Y.

CLEVELAND • CHICAGO • DETROIT • LOS ANGELES • BUENOS AIRES • SÃO PAULO

WE WELCOME YOU

to a New Era of Electrode Performance

AN EXCLUSIVE STEP FORWARD ....

in the techniques of electrode manufacture now gives GLC graphite electrodes a coefficient of expansion lower than any other electrode on the market today.

The resultant rugged resistance of GLC graphite electrodes to thermal shock substantially reduces breakage and spalling, and affords worthwhile economies in electric steel production.

This achievement is a result of a high degree of integration between discoveries in our research laboratories, refinements in processing raw materials, and improved techniques in electrode manufacture.

Lower operating costs experienced by our customers are a reflection of our partnership in their progress, and point the way to a new era of electrode performance for the electric furnace steel industry as a whole.

GLC ELECTRODE DIVISION

Great Lakes Carbon Corporation

GRAPHITE ELECTRODES, ANODES, MOLDS and SPECIALTIES

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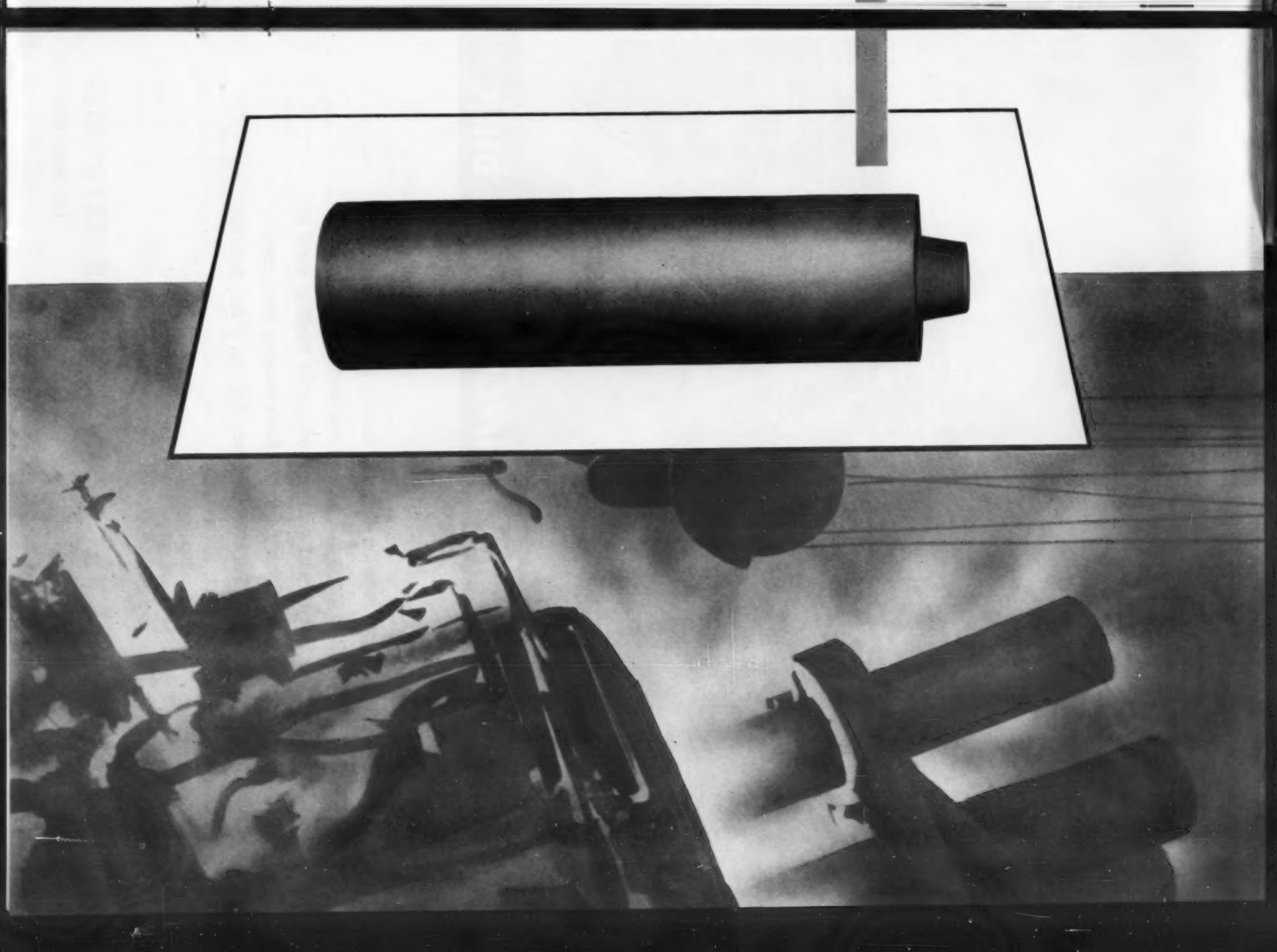
Sales Agents in Other Countries: Great Northern Carbon & Chemical Co., Ltd., Montreal; Overseas Carbon & Coke Company, Inc., Geneva; Great Eastern Carbon & Chemical Co., Inc., Chiyoda-Ku, Tokyo.



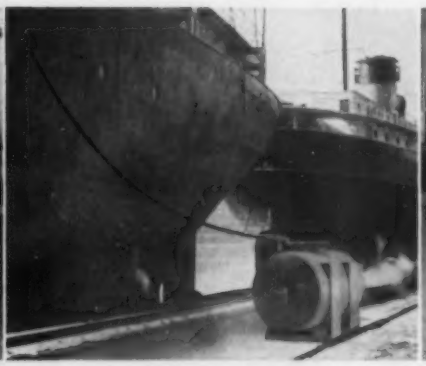
Here's *MASS-HANDLING* of bulk

What you see above is a Dempster-Dumpster serving one of its detachable containers. Multiply this simple pick up, haul and dump operation by scores of steel containers built to meet your requirements for handling waste or salvable materials, raw and finished products, fluids including acids, combustibles, dusty materials, etc. You have, then, mass-handling of bulk materials with one truck and one man!

AD 5053

Tilt Type Container is handling filter dirt at a plant in Illinois. Note container is equipped with casters and placed under chute, through which the filter dirt passes directly from presses. As each container is filled, it is replaced with an empty one.

Three heavy duty Drop Bottom Type Containers, shown below, are loaded with cast iron fittings from conveyor at plant in Birmingham. Dempster-Dumpster picks up each container when loaded and hauls the finished products to shipping department.

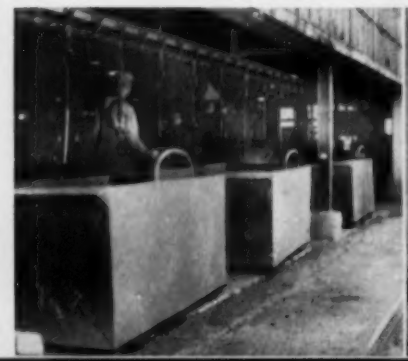


Tank Type Container is being filled with used oil from a ship. Time required to haul loaded container to reclaim station, drain and return for refilling—10 minutes. Time cycle of the former method using conventional barrels—60 minutes.

Here's another example of the many types of waste materials handled by this system. The Skip Type Container shown below is located under hydropulper at a paper plant. Picture was shot while container was being filled with rope waste sludge.

A loaded Apartment Type Container, equipped with roller bearing casters, is being rolled to outside of this plant building. Dempster-Dumpster will pick it up, haul to disposal area, dump the refuse and return empty container for refilling.

Waste materials are loaded into these Universal Containers at a food plant warehouse. Containers have lids in top, as well as a door in each end, which are opened to make deposits, then closed, sealing materials in container.



materials with one truck...one man!

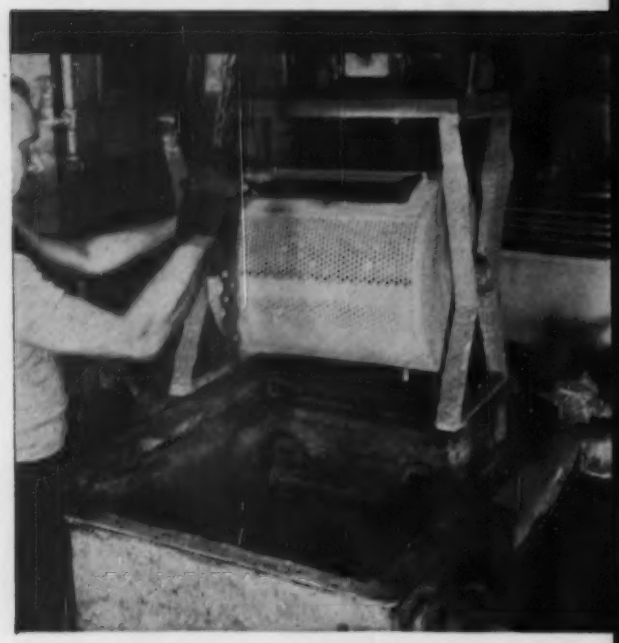
A FEW OF THE HUNDREDS of containers available are shown above in actual service. They are built in capacities up to 21 cu. yds.—several times the capacity of the average dump truck body. One Dempster-Dumpster, operated by only one man, the driver, serves scores of big detachable containers, one after another—handling materials of every description. It's like having one truck with scores of bodies!

Records of performance in dozens of installations prove beyond question that savings are tremendous! The Dempster-Dumpster System cuts costs of equipment and operation. It is common knowledge that one Dempster-Dumpster will perform the work of several conventional trucks, reducing investment accordingly. This system eliminates standing idle time and re-handling of materials. Once placed in these containers, materials remain there until hauled to destination. Efficiency, sanitation and good plantkeeping are big advantages. Materials to be transferred or disposed of are constantly being placed in the containers as they accumulate. Containers for handling refuse are fire-proof, rat-proof and scavenger proof.

With no obligation on your part, our engineers will be glad to make a comprehensive fact-finding survey to determine the cost-cutting possibilities of this equipment in your plant. Write us for complete information today! Manufactured exclusively by Dempster Brothers, Inc.

DEMPSTER BROTHERS 475 N. Knox, Knoxville 17, Tennessee

at SESSIONS CLOCK Co.



PLATECOILS save $30 to $50 per month gas bill in Jetal tanks.

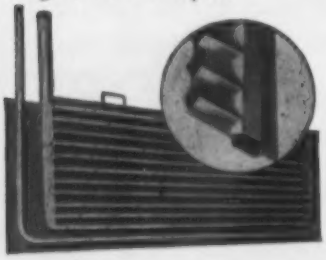
PLATECOILS heat alkali tank without downtime.

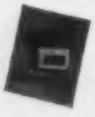
PLATECOILS cure coil-itis

PLATECOILS®

eliminate weekly pipe coil cleaning in lubrite tanks

A Tranter Platecoil installed in July, 1952, has *never* had to be removed for cleaning. Previously, two sets of pipe coils were used. One was cleaned while the other was in the tank. The sets were changed every 4 or 5 days. The complete banishment of unproductive downtime in this instance is matched by other types of savings in other installations. In many cases, Tranter Platecoils have reduced warmup time because they actually do transfer heat faster. They have increased tank payloads because they take less space. They have saved maintenance time and money because they are installed on simple hangers and can be removed and replaced much more quickly than pipe coils on complicated racks or brackets. Put Tranter Platecoil's savings to work for you.





Write today for Bulletin No. P73 See how 12 companies are effecting savings every day by using Platecoils.

Platecoils overcome the limitations and operating difficulties of pipe coils by heating or cooling 50% faster, taking 50% less space and saving up to 50% on initial and maintenance costs.

PLATECOIL Div. TRANTER MANUFACTURING, Inc., Lansing 4, Michigan

new PRATT & WHITNEY

48 inch precision VERTICAL ROTARY TABLE

LATEST ADDITION TO THE COMPLETE P&W LINE OF PLAIN, TILTING and VERTICAL ROTARY TABLES

This rugged, new Rotary Table is designed especially for inspecting large, heavy work pieces . . . such as aircraft parts, machine elements, jigs, fixtures and other precision products . . . with speed, ease and accuracy. It can also be used to provide precise work location on heavy equipment for boring, face milling and other machining operations.

Table dial graduations read direct to 1 minute of arc, vernier graduations to **2 seconds**. Fast power rotation, in either direction, is provided by a ¾ hp reversible motor. Like all P&W Precision Rotary Tables, this new 48" Model is hand scraped and inspected to rigid standards of accuracy.

PRATT & WHITNEY

DIVISION NILES-BEMENT-POND COMPANY

WEST HARTFORD 1, CONNECTICUT, U.S.A.

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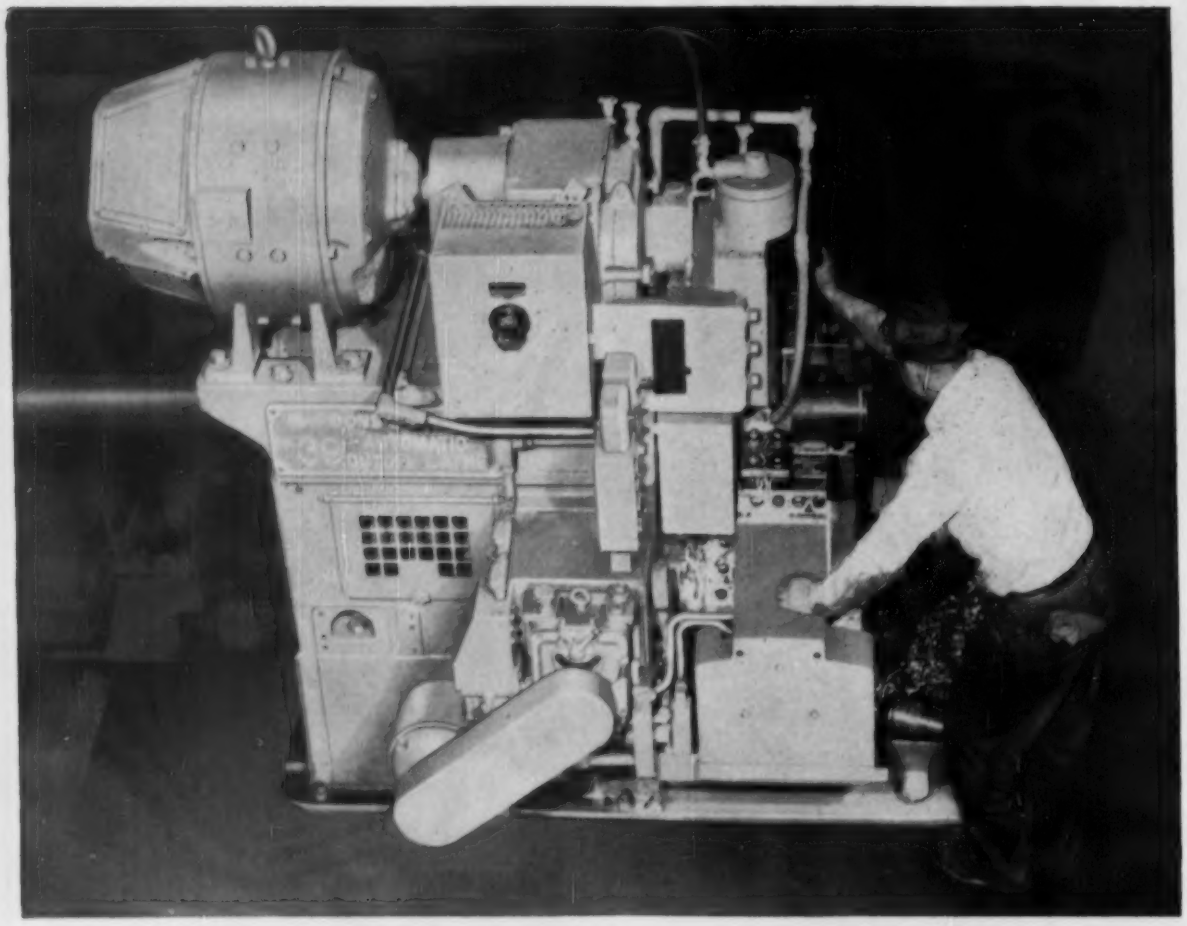
To provide expert application engineering service, all Pratt & Whitney products are made available to you only through our own Factory-Direct Representatives. Each a specialist, these men — working from Branch Offices conveniently located throughout the country — are fully qualified by training and experience to help solve your production problems . . . to help you select equipment exactly right for your specific needs.

FIRST CHOICE FOR ACCURACY SINCE 1860

MACHINE TOOLS • CUTTING TOOLS • GAGES



Photograph courtesy of The Colorado Fuel and Iron Corporation

"Excellent Performance . . . Very Low Maintenance Cost"

AT

THE COLORADO FUEL and IRON CORPORATION

The Superintendent of The Colorado Fuel and Iron Corporation's new Seamless Mill reports *excellent performance* and *very low maintenance* cost on their Bardons & Oliver Cutoff Lathes. At present, the mill has in operation four pairs of Bardons & Oliver Crop End Cutoff Lathes cropping pipe 2⅜" to 9⅝" diameter. Two other machines are used for cutting coupling stock from 3.063" to 9⅛" diameter.

Many of the leading pipe and tube mills have standardized exclusively on Bardons & Oliver Cutoff Lathes. Over 60 years of manufacturing experience is your assurance of quality machines for continuous operation and high rates of production. Send your blueprints to Bardons & Oliver engineers for individual attention without obligation.

MANUFACTURERS OF A COMPLETE LINE OF TURRET LATHES AND CUTTING OFF LATHES

BARDONS & OLIVER, INC.

1136 WEST 9TH STREET • CLEVELAND 13, OHIO

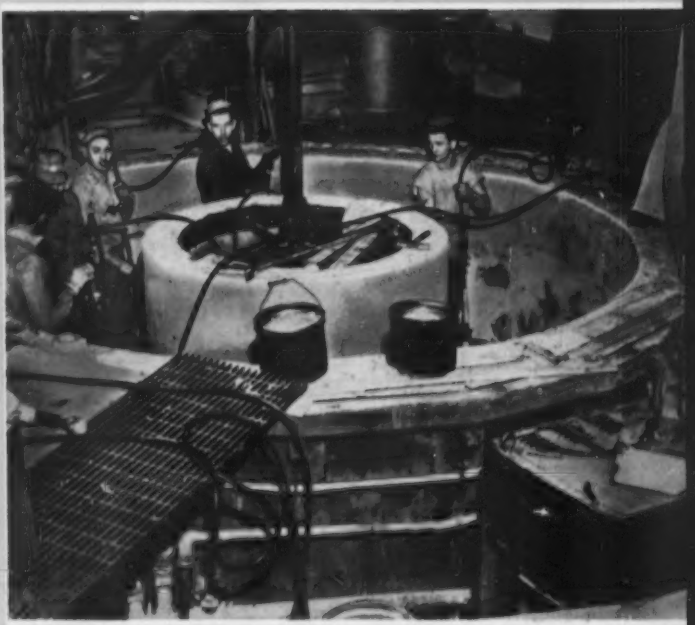
NEW B&W MULRAM 3200 *degree* Refractory Ramming Mix

More than two years service under tough conditions of slagging and metal penetration have proved the economy of B&W's new ramming mix, Mulram. Used to form monolithic refractory structures, B&W Mulram, which has a crushed fused-mullite base, is recommended for temperatures up to 3200 F. Its combination of low porosity and permeability, when installed, give Mulram the highest possible resistance to metal or slag penetration.

Not only is Mulram's permeability low, but it actually decreases from the hot face to the cold face. This means an *increasing* resistance to penetration through the thickness of the lining. Standard firebrick, on the other hand, have a higher and constant permeability through their thickness.

This combination of maximum resistance to slag and metal penetration and the 3200 F use limit are the chief reasons why B&W Mulram has given superior service in applications like these:

- **Barium chloride salt bath furnaces**
- **Linings for indirect-arc electric furnaces melting iron, steel or non-ferrous metals**
- **Forehearths or holding ladles for gray and malleable iron**
- **Runners and slagging basins on continuous cupolas**
- **Crucible furnace walls.**



B&W Mulram is being rammed into the bottom of this salt bath furnace. Furnace walls are formed with B&W Mulram, backed up by B&W's 3000 degree castable, Kaocast, and insulated with B&W K-20 Insulating Concrete Mix.

Even when penetration is not a serious problem, B&W Mulram often proves economical in such applications as burner blocks or burner tunnels because of its volume stability and high hot-load strength after proper firing. Standard Mulram is made in 4-mesh size, wet or dry form (Mulram 4W and 4D). Other mesh sizes are available for special applications. Call or write your local B&W Refractories Engineer for complete information.

B&W REFRACTORIES PRODUCTS: B&W Allmul Firebrick • B&W 80 Firebrick
B&W Junior Firebrick • B&W Insulating Firebrick • B&W Refractory Castables, Plastics and Mortars
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GENERAL OFFICES: 161 EAST 42nd ST., NEW YORK 17, N.Y.
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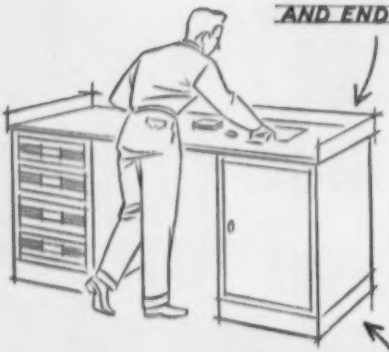
B&W

8959

HOW TO USE STANDARD HALLOWELL UNIT WORK BENCHES AND ACCESSORIES IN PLANT MODERNIZATION

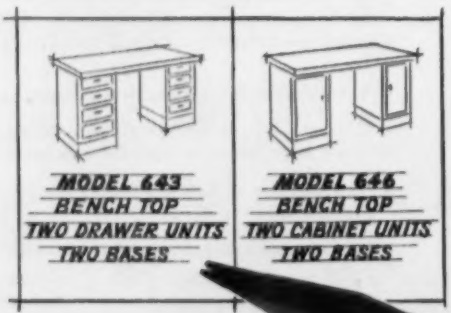
MODEL 640 - BENCH TOP, DRAWER UNIT, CABINET UNIT, TWO BASES

ASSEMBLE THEM IN CONTINUOUS LINE - JOINED IN THE MIDDLE OF THE UNITS OR BUTTED END-TO-END



USE THEM AS INDIVIDUAL BENCHES

4 TOP MATERIALS, 2 LENGTHS, 2 WIDTHS
2 HEIGHTS - ALL STANDARD



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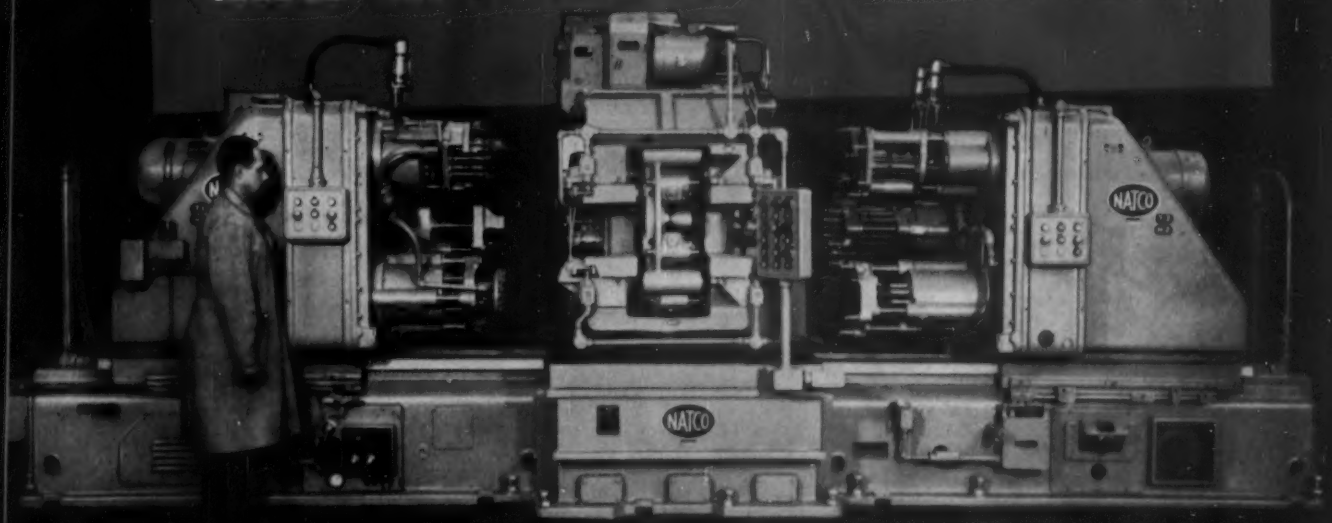
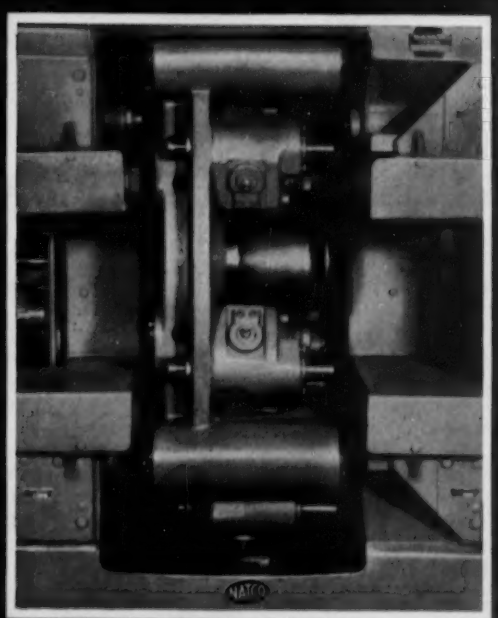
COMBINING OPERATIONS on a NATCO Cut Costs and Increased Production!



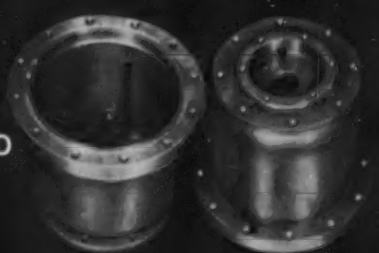


Close up view of 6 position Trunnion Fixture

109 REFRIGERATOR COMPRESSOR SHELLS PER HOUR

Estimated Gross Production

DRILLED
COUNTERBORED
REAMED, TAPPED
CHAMFERED
BURRED



Total . . . . . 77 OPERATIONS

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RICHMOND, INDIANA

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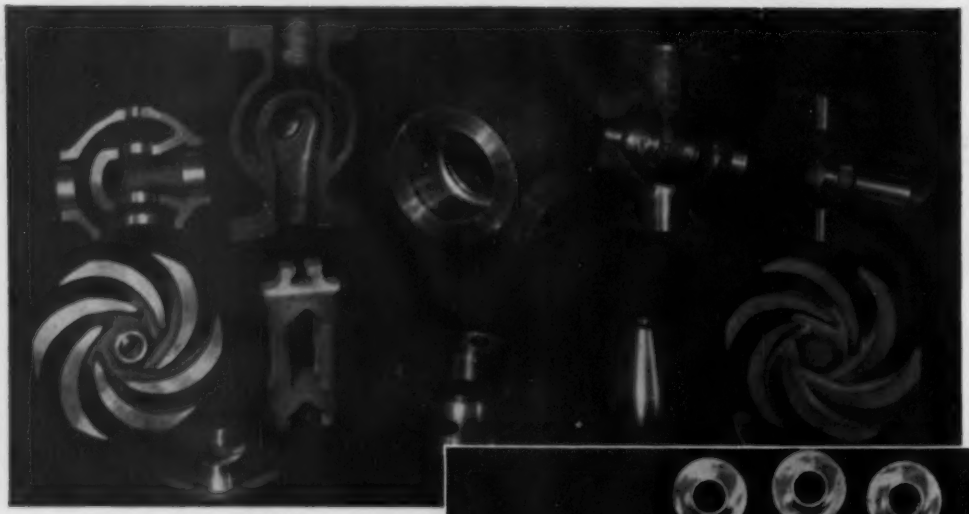
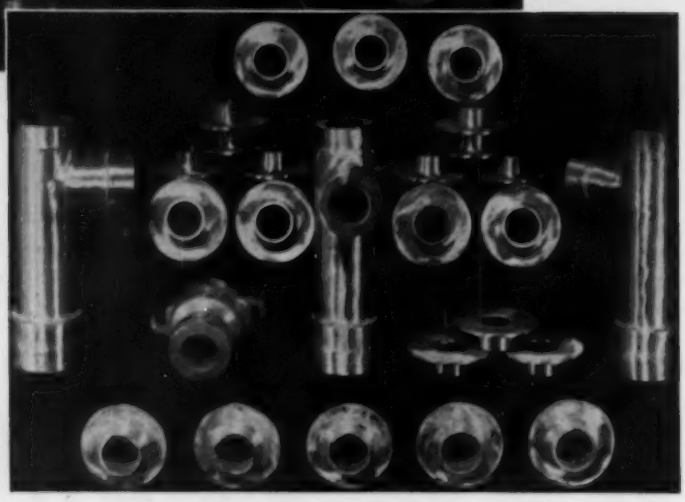
NATCO





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It not only means experience in stainless casting applications, but in maintained high quality, too. The A-L Buffalo Foundry is a pioneer in both the vertical-centrifugal and static methods of casting stainless steel. You can depend upon Allegheny Metal Stainless Castings to be strong, clean-surfaced, sound-structured and easy-machining . . . fully in accord with the service conditions and with your requirements for delivery.

Let our stainless foundry specialists quote on *your* problem jobs—any shape casting or any size, up to thousands of pounds. ● *Allegheny Ludlum Steel Corporation, Oliver Bldg., Pittsburgh 22, Pa.*

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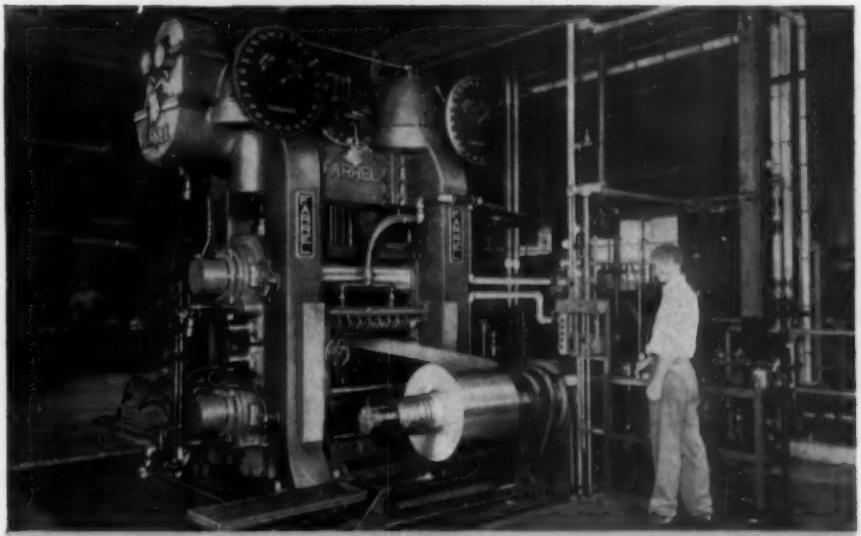
Allegheny Metal

AL® TIME-TESTED STAINLESS STEEL

WAD 5007 Warehouse stocks carried by all Ryerson Steel plants

MEET THREE SOLUTIONS
to specific production problems

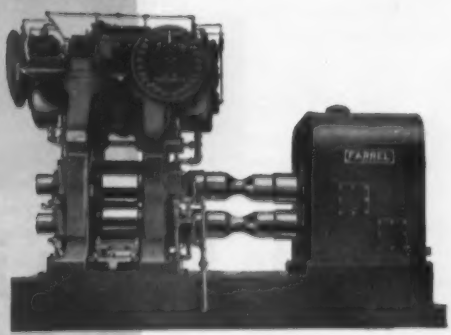


4-High Aluminum Foil Mill

Designed specifically for increasing aluminum foil production, this mill has 9" x 46" work rolls and 21" backup rolls. The speed of mill operation can be varied to meet production requirements by means of an adjustable-voltage control system.

High Carbon Cold Strip Mill

10" x 10" mill specially designed for close gauge control in continuous high-speed, cold rolling of high-carbon strip steel.



7-Stand Hot Copper Rod Mill

Seven-stand, two-high (nominally three-high) hot copper rod mill finishing train, with three low stands for handling ovals, and four high stands for handling squares.

Each mill illustrated here was designed by us with the particular requirements of the individual customer in mind. Each provided an efficient, economical solution to a specific production problem.

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One of several
20-ton Ni-Hard drop balls used for optimum fragmentation in reclaiming steel scrap from slag by Heckett Engineering, Inc., of Butler, Pa. Cast by United Engineering & Foundry Co., Canton, Ohio.

How to lick the job of reclaiming scrap

—use NI-HARD

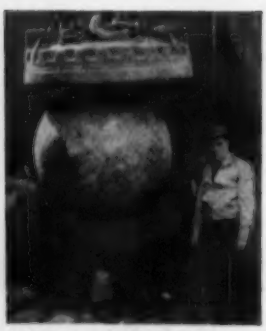
LOOK AT TYPICAL RESULTS obtained by using NI-HARD drop balls. At the Vulcan Mold and Iron Company plant in Latrobe, Pennsylvania, for example . . . .

Since October 1952, a 6-ton NI-HARD ball has broken up an average of 250 tons of cast iron scrap, daily, five days a week. So far, this represents some 10 to 1 improvement over unalloyed cast steel balls previously used.

Back in May 1953, at Vulcan's plant in Lansing, Illinois, an unalloyed ball split after 3 months' use. But its replacement . . . a 10-ton Ni-Hard ball . . . is still smashing scrap.

Although particularly notable for abrasion resistance, Ni-Hard is tougher than its hardness indicates. And this means long life for Ni-Hard drop balls.

Wherever you encounter severe abrasion . . . specify Ni-Hard. Send us details of your problem. Let us give you suggestions based on wide practical experience. We'll also send you a list of foundries that supply Ni-Hard. So write INCO today.



10 times longer life
than steel balls previously tried by Vulcan Mold & Iron Co., attests to stamina of Ni-Hard balls, produced by United Engineering & Foundry Co.

INCO TRADE MARK **THE INTERNATIONAL NICKEL COMPANY, INC.** 67 WALL STREET NEW YORK 5, N.Y.

DESIGNING WITH ALUMINUM

NO. 14

This is one of a series of information sheets which discuss the properties of aluminum and its alloys with relation to design. Extra or missing copies of the series will be supplied on request. Address: Advertising Department, Kaiser Aluminum & Chemical Sales, Inc., 1924 Broadway, Oakland 12, California.

PREPAINT TREATMENT OF ALUMINUM

THE prepaint treatment of aluminum is more important to the quality of the coating system than is the paint itself.

Depending on type of service, severity of exposure, and cost consideration, the prepaint treatment may vary from wiping the surface clean with a rag dampened in solvent to the application of a complex chemical conversion coating.

Three factors determine the quality of the finishing system:

1. Thorough cleaning and complete rinsing.
2. Proper choice and application of adequate surface preparation.
3. Specified application of proper paint system.

Cleaning

The five major methods of cleaning aluminum before further surface treatment are: 1. mechanical. 2. alkaline detergents. 3. emulsion cleaners. 4. organic solvents. 5. acid cleaners.

When the metal is heavily soiled, or when the soil is difficult to remove, two or more of these cleaning methods may be necessary.

Some types of metal soiling occur naturally. Other types of soil are intentionally applied during fabrication. The soil may consist of solid particles (metal chips, abrasive grains, shop dirt, etc.), organic substances (greases, soaps, buffing compounds, etc.) and corrosion products (oxides, etc.), each affecting the choice of the cleaning method.

These soils may vary greatly from one industrial plant to another or on different kinds of work in the same plant. Consequently, a universal cleaning process is not possible, and the selection of the proper cleaning method for removing each particular soil becomes as important as any other step in the entire painting procedure.

Table I may be used as a guide in selecting cleaning methods for certain types of soils. However, the advice and services of the suppliers of cleaners and cleaning machinery should be solicited.

Chemical Surface Treatments

Chemical surface treatments are designed to provide:

1. A surface that will provide the most "keying" for subsequent coatings.
2. A stable, adherent, corrosion resistant film that will protect the metal if the paint chips, cracks or flakes from a small area or spot and which will prevent the spread of corrosion under the paint film.

The chemical surface treatments that have been developed may be divided into two general groups; those produced with the aid of electrical current, and those produced without electrolytic action. The latter are known as chemical conversion coatings.

Anodic Electrolytic Process

Anodizing is the most widely used process for surface treatment of aluminum. Anodic coatings may be produced by

PLEASE TURN TO NEXT PAGE ➡

TABLE 1

Article Prepared by the Kaiser Aluminum Metallurgical Research Department and Reprinted With Permission from *Western Industry*, October, 1954.

	Mechanical Cleaning	Alkaline Cleaners	Emulsion Cleaners	Organic Cleaners	Acid Cleaners
TYPES	Shot blast. Grit blast. Wire brush. Sandpaper.	Hot or cold. Etching or non-etching. Immersion. Spray.	Immersion. Spray.	Solvent wiping. Solvent immersion. Vapor degreasing.	Organic and inorganic acids. Usually mixture of two acids.
USES	Castings. Rough work. Heavy pieces. Removes surface dirt and corrosion products.	Best for removal of widest range of soils. Etching type good for corrosion products.	Removes oil, grease, and some loose dirt. No effect on corrosion products.	Removes oil, grease and some loose dirt. No effect on corrosion products.	Removes corrosion products or pickle. Neutralizer after alkaline cleaning. Smut removal.
EFFECTIVENESS	Provides mechanical adhesion. Removes surface metal and oxide.	Most effective of the group. Better with acid rinse.	Not effective on adherent soils or corrosion products.	Since the dissolved oil and grease remain in solution, some is redeposited.	Best if used in conjunction with alkaline cleaners or vapor degreasers. Some types used as paint base.
AFTER-TREATMENT	Further cleaning and treatment required for best results.	Neutralize with acid dip or for conversion coating rinse with water.	For best results follow with alkaline or acid cleaner.	For best results follow with alkaline or acid cleaner.	Water rinse.
PRECAUTIONS	Blasting of any type may distort thin sections.	Aluminum is readily dissolved by alkali. Use inhibited solution.	Thorough after-rinse necessary.	Some solvents inflammable, others toxic.	Acids improperly used create health hazards.

TABLE 2	Chromic acid anodizing	Sulfuric acid anodizing
TYPE OF COATING	Gray to greenish-gray impervious oxide film in the range of 0.00003 to 0.0001 in. thick.	Porous oxide film of various color depending on the alloy. Thickness from 0.001 to 0.002 in.
PROPERTIES	Excellent corrosion resistant. Excellent paint base. Good abrasion resistance. Limited as mordant for dyes.	Corrosion and abrasion resistant base for paint. Excellent mordant for dyes.
APPLICATION PROCEDURE	1. Hot mild alkaline cleaner. 2. Cold water rinse. 3. Parts made the anode in a 5–10% solution of chromic acid at 95 deg. F. 4. Increase voltage gradually over 5 minute period to 40 v. Hold for 30 min.	1. Hot mild alkaline cleaner. 2. Cold water rinse. 3. Parts made the anode in a 10–25% solution of sulfuric acid at 65–90 deg. F. and 15–20 v. 4. Hold for 20–30 min. 5. Cold water rinse.
COMMENTS	1. Agitation by air or mechanical stirrer is desirable during processing. 2. May be used on assembled parts since entrapped acid has very little effect on corrosion.	1. Suitable for all alloys of aluminum. 2. Not acceptable on assembled or formed parts where acid may be trapped, because of danger of corrosion by entrapped acid.

many different methods with various degrees of hardness, porosity and thickness. The surfaces they provide are resistant to corrosion and abrasion and are an excellent base for organic finishes. Of the many electrolytes that can be used, the sulfuric acid and chromic acid types have received the widest acceptance in the United States. The important features of each are shown in Table II.

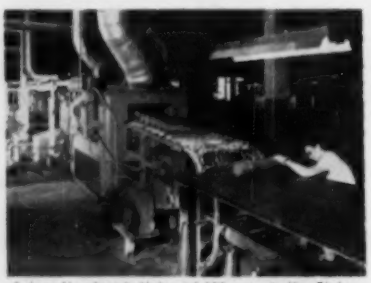
Continuous anodic coating of coiled aluminum strips. Picture courtesy of Monarch Metal Weatherstrip Co.

Conversion Coatings

Only a limited number of chemical conversion coatings for aluminum have been extensively used commercially. They are well adapted to modern production requirements. One of the oldest and best known of these is the M.B.V. (modified Bauer-Vogel) process. The oxide coating it produces is not as hard or thick as an anodized coating, but it is adequate for some applications. Parts to be treated are immersed in an alkali carbonate–alkali chromate solution. Following this immersion, they are rinsed in cold water, then in hot water, and then dried. This treatment produces a good bonding surface for paints, but it is not well suited to aluminum alloys containing more than 5% copper.

Two types of phosphate conversion coatings to come out of World War II as treatments for aluminum are the complex chromate phosphate fluoride coatings and the zinc phosphate coatings. Each of these coatings has many desirable properties and a wide range of applications. The complex chromate phosphate fluoride coating differs from the other phosphate treatments in that the film produced is amorphous rather than crystalline. Since it can be applied by spray or dip following conventional precleaning, it is well suited to mechanized finishing procedures. This type of coating offers an excellent base for paints. The zinc phosphate coating, originally developed for iron and steel, has been adapted to use with aluminum. This type of coating produces a film on aluminum that increases the corrosion resistance and paint adherence of the surface. The outstanding feature of the zinc phosphate coating is that parts with mixed metal surfaces may be successfully treated in one operation. Most surface methods do not have this feature.

Several further improvements in chemical conversion coatings have recently been introduced in the form of chromate finishes. These coating solutions may be applied by brush, spray or dip and the contact times required are relatively short, ranging from seconds to eight minutes. Consequently, they are well suited to automatic equipment. A crystalline chromate coating can be used as a final finish on aluminum or as a base for subsequent paint films.



Automatic phosphatizing of 155 mm. shells. Picture courtesy of Cincinnati Cleaning & Finishing Machinery Company.

One important feature claimed for these new chromate coatings is that they have a minimum effect on the electrical properties of aluminum to be used in either low or high frequency work. Their potential field of application is quite great. As they become more widely used, improvements and modifications are sure to appear. For further information concerning the pre-paint treatments available for aluminum, contact the Kaiser Aluminum sales office listed in your telephone directory, or one of our many distributors. Kaiser Aluminum & Chemical Sales, Inc., General Sales Office: Palmolive Building, 919 North Michigan Ave., Chicago 11, Illinois; Executive Office: Kaiser Building, Oakland 12, California.

Kaiser Aluminum

see our catalog in 69 PRODUCT DESIGN FILE or write for copy

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Only accurate forming could solve this problem...

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CINCINNATI
SHAPERS, SHEARS,
PRESS BRAKES
BOOTH 1105

Note the clean straight lines of the moldings formed on the Cincinnati Press Brake.

Photos courtesy of E. O. Bulman Mfg. Co., Inc., Grand Rapids 2, Mich.

The long steel shelves of these sectional display racks are formed so accurately that sections match perfectly with lines straight and clean.

The Cincinnati Press Brake is forming to such close tolerances that a masking strip previously used is eliminated. A production increase and no discards has materially reduced costs while product was improved.

Write for the New 72-Page Cincinnati Press Brake Catalog.

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- Review with us the status of any orders that you have in process, and tell us who to call regarding these orders in your absence.
- Leave the name and phone number of your Ryerson sales representative with your associates —also give them the name of your Ryerson inside contact man. This will assure your people the same prompt personal steel service you have learned to count on.

With these steps the nation's largest steel stocks —all certified for quality—will be as handy as inventory in your own plant. And you will have working for you unequalled steel-service experience and steel-service facilities. So plan ahead—and you will have that wonderful vacation—without a worry.

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The Iron Age Newsfront

Ike May Join Anti-Competition Fight

President Eisenhower may jump into the anti-government competition fight next year. His strong objection: A provision of this year's defense money bill which requires a Congressional OK before the Pentagon can end a commercial activity more than 3 years old. Ike backs industry's stand that the provision should be at least 15 and preferably 25 years.

Auto Glass: Looking In On Nashville

A glass manufacturing plant with 1 million sq ft of floor space will be built by Ford at Nashville, Tenn. Construction of the plant, another in the company's latest expansion program, will start later this year and is scheduled for completion in 1957.

Price Rises: Competition The Moderator

Despite booming business, competition is still the big factor in industry. Now it's a moderating influence on price rises. Top managements polled recently have one eye on competition, the other on rising costs while trying to decide how much to boost prices.

Stronger Cord for Portables' Power

A new type electrical cord for such portable machinery as grinders, drills and power saws has been developed. The cord's impact strength is rated 197 pct greater than present mold cured cords.

Leaded Steels: Faster Machines Wanted

Increased use of leaded steels is spurring development of new machine tools which can take advantage of easier machining characteristics. Some machine tool men are finding leaded steels can be machined at speeds beyond the capacity of present designs and are moving to meet the need with machines capable of greater output.

A New Era of Higher Speed Machining

Although production rates using leaded steels are generally kept quiet for competitive reasons, pressure is building up for a new era of higher speed machining. Producers of leaded steels are continuing to give close attention to the steelmaking processes to assure high quality of the product.

New, Rebuilts to Ease Car Shortage

Metalworking firms that ship a large percentage of their output by rail will find the shortage of freight cars eased somewhat in the months ahead. Boxcar shortages usually peak in early autumn when farm shipments rise. Railroads, with more than 45,000 cars on order, are speeding repairs to get another 25,000 cars back in service.

Building Materials In Smaller Packages

Watch for increased emphasis on smaller packages in palletizing of building materials. Bricks, already packaged in units of 100, will be available some time this year in even smaller, easy to carry units.

Steel: Reductions Without Relief

Further reductions in customer allotments of steel forecast earlier are beginning to appear. Already hit, and with little indication of relief before the latter part of the fourth quarter, are plate and structurals.

Test Hardness Without Marring Surface

Coming soon is a non-destructive hardness tester for in-process checking on an automated line. Instrument measures rebound *velocity* of a tiny hammer, correlates this with velocities from known hardness specimens. Bonus: The unit does not mar finished surfaces.

NEWSFRONT · NEWSFRONT · NEWSFRONT · NEWSFRONT · NEWSFRONT

LIKE SPECTACULAR COST CUTTING MACHINERY . . . .

that consolidates production operations in a single machine to speed up production and eliminate wasteful handling

CMP *cold rolled strip steel...*

can help step up your production rate

By working to restricted specifications for size, physical characteristics and finish, realized through precision cold rolling and heat treating processes, CMP can help in many ways to step up the production of parts made from flat rolled steel.

In many cases, "working qualities" can be so improved that machine speeds can be stepped up as much as 25%.

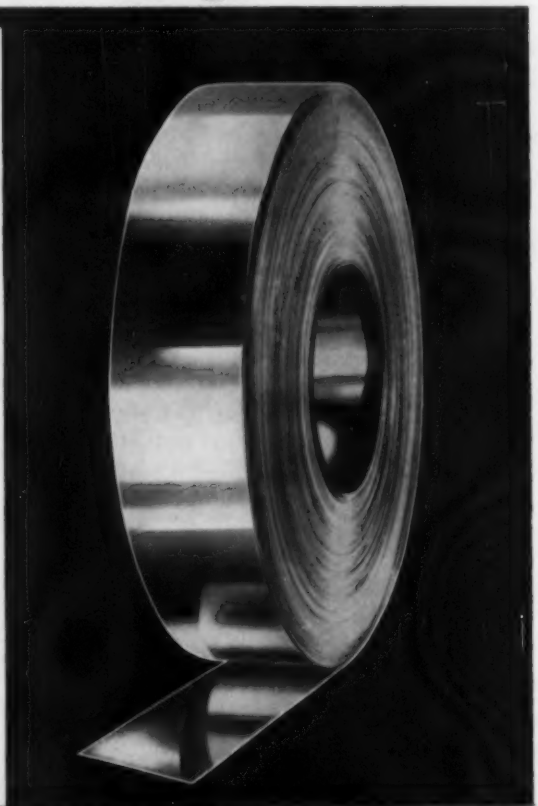
Frequently, qualities can be developed which permit simplification of tooling.

In some instances, restricted specifications may be developed which completely eliminate operations.

Where precision fitting is encountered, dimensional accuracy can be developed to greatly speed assembly and eliminate rejections.

In all cases, users enjoy the usual time-saving advantages of CMP's customary precision gauge and width tolerances . . . more footage per coil . . . fewer production shutdowns for coil replacement on automatic-feed operations . . . longer tool life.

CMP's extensive experience in development of steel specifications for more efficient and economical production is always at your service.



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PRICES: Watch Out for Inflation

Steel price hike speeds inflationary trend . . . Labor costs are at the bottom of most price increases . . . Competition is the only brake to keep price tags from going higher . . . Industry survey.

JRVEY
E RISES
Says Many
Most Steel Users Plan to Boost Prices
Series of Price Hikes Coming
CAN THE STEEL COMPANIES "AFFORD" A WAGE INCREASE?
The profits after taxes of the steel industry thus far this y
total of two million
Price Pressure Hits Zinc
'56 Model Auto Price Hike Expected to Average $100
Prices May Be Boosted

◆ WE'RE OFF on a tiger-by-the-tail inflation spiral. It's going to cost more to do business and the odds are your firm will have to raise prices. You won't be able to forget about inflation when you leave the office either — higher prices will follow you right into your living room.

For the last several years, industry has pared its profit margins to the quick, absorbing increased labor and material costs for the most part without raising prices. But this trend is now over. The steel price increase has triggered a new inflation cycle, but there are a lot of other forces working with it. (For latest developments on steel price increases see p. 148.)

It's Inevitable

In addition to higher steel prices, cost of other materials has risen: copper was recently upped 3¢ per lb; primary aluminum prices were boosted early this year and another price hike will be on the way as soon as current contract negotiations are over. Zinc price has been bumped twice within the last few months.

Add these inflationary pressures to the average steel price increase of $7.50 per ton and the result is obvious—prices on just about everything you can think of are due to rise.

Another problem facing industry is the increased cost of labor. The autoworkers with their 20¢ package and the steelworkers with an average pay hike of 15¢ per hour have set the pattern for labor contracts still to be worked out in other industries. This cost too will have to be passed on.

Survey by THE IRON AGE shows that prices of most steel consuming industries will be upped 5-8 pct. As yet most of the price increases have not been put into effect. But the chances are your suppliers are poring over their price sheets right now.

Rule of thumb on the current inflation wave is that firms which use steel as the main raw material will be the first to up their prices. Reason is they're in better position to judge just how much their production costs are going up. In some cases companies will main-

tain current price levels until their inventories of pre-price increase steel are used up.

Here's the Picture

Here's the price outlook on specific industries surveyed by THE IRON AGE:

AUTOMOTIVE: The Big Three aren't going on record as yet, but price increases are definitely in the offing. They won't up the tags on '55 models because they want to make sure stocks are cleaned up before the '56 cars come out. But it's a safe bet '56 models will cost more. One of the smaller automakers estimates there will be an industry-wide boost from $50 to $120 per car depending on the model.

Possible dodge some automakers may use is to make what has been standard equipment in the past optional at extra cost on '56 cars.

STAMPERS: Big stampers in the Detroit area figure the steel increase will up their costs about 10 pct—this will be passed on immediately on any new jobs. Stampers in other areas indicate the will jack up their prices between 2 and 5 pct. They'd like to go for more but competition is too stiff. This means some stampers are going to take a beating on costs.

FOUNDRIES: Will definitely increase prices—some as much as 7-10 pct. Price jump may not come immediately as labor negotiations are scheduled in August and foundries would rather make one price increase than two. However, if someone beats the gun likelihood is all foundries will follow.

APPLIANCES: Will boost prices—but not across the board. Despite good business, competition is extremely hot, so appliance makers will spot their increases where they think they can get away with it. Advance should average out to about 2-3 pct. Appliances using a lot of steel and copper like refrigerators and air conditioners seem sure bets for higher price tags. As one appliance manufacturer puts it: "The values offered today may never be duplicated."

MACHINE TOOLS: Not too much affected by increase in steel prices since comparatively little finished steel goes into machine tools. In addition, prices have already been increased this year. But coming up are wage talks which some builders fear may result in about a 10 pct cost increase. Outlook is that there may be a small price increase coming, but it will be applied gradually.

INFLATIONARY spiral is likely to hit hubby's pocketbook when the missus sets out on her Fall shopping expedition this year.

are written into a contract, the increased cost of steel is already showing up. Price picture is shaping up slow since much of the work in this field is by contract. Manufacturers have to anticipate what their costs will be 3 to 6 months from now.

FASTENERS: Price increase range is up to a top of 8 pct. Special items are running on the high side, while standard fasteners have been raised less. Rivet prices will probably be boosted around 7 pct, although producers are still waiting for industry leaders to set the pattern.

FORGINGS: An increase of 8-10 pct has already been tested in some areas and customers seem willing to accept the price jump. Average will run between 7-10 pct with occasional markups of as much as 18 pct.

FARM EQUIPMENT: Advances are expected though not across

FREIGHT CAR BUILDERS: Picture here is easier to figure since steel makes up the great bulk of material used. Prospect is price will be jacked up 5-6 pct, but this will be less than total increase in manufacturing costs. In addition to the average 5.9 pct increase they'll have to pay for the steel they use, car builders will be hit by the higher prices passed along by fabricators of components such as car roofs, doors, air brakes, etc.

HEAVY EQUIPMENT: Where price increase escalator clauses

Steel
Price Boost
Now Indicated
$5 Ton Rise Looms Soon

Reflect Wage Increase
Fine, Book Paper Prices Ad
Fine paper prices were raised $5 ... eral 5 per cent wage increase and ... Kraft ...

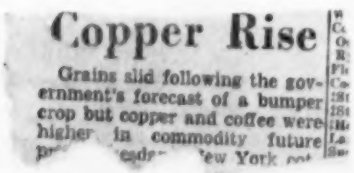
WHEN new automobile models begin rolling off assembly lines later this year they probably will sport higher price tags as well as new silhouettes. Higher wages for autoworkers and higher prices for steel are factors.

the board. Weak profit items are in line for main price boosts. Labor costs are rising, putting farm equipment manufacturers on the spot as farm buying is slowing down.

CASTINGS: Average increase so far has been about 4 pct on gray iron. Some steel castings have been upped 10 pct. Labor, scrap, pig iron, and coke costs are expected to rise. If current price increases are held to 5 pct or less it could mean another boost in the fall.

PACKAGING: Pass-through is running about 4.5 pct to 6 pct. Increase followed immediately after steel price rise and hits strapping in heavy duty and box grades.

IRON ORE: Labor costs are due to go up, but ore companies


Copper Rise

Grains slid following the government's forecast of a bumper crop but copper and coffee were higher in commodity future

can't increase the price this year because of seasonal contracts. But next year they'll make up for it.

WELDING: Price of welding rods is expected to remain fairly stable, despite the fact that wire rods used for some types of electrodes were upped $7 per ton. One of the larger welding equipment manufacturers plans to absorb all of the price increases—the firm just finished its best 6 months in history.

AUTO SUPPLIERS: Most of the firms in this industry are faced with higher labor costs stemming from the auto and steel wage settlements. Where companies have a wide variety of steel products they will probably put through an average across-the-board boost and keep their fingers crossed that they get away with it. On items like automotive valves .01¢ can be the difference in getting or missing a sale.

MICELLANEOUS: Moderated only by the forces of competition, inflation eventually affects cost of everything produced by U. S. industry. It also has a habit of doubling back on those industries that, often through no fault of their own, are pressured into raising their prices in order to maintain a decent earnings record. The steel industry, for instance, had to take this into consideration before settling on a price increase to offset the wage hike to its employes. From past experience, steel producers know that eventually the cost of goods and services to them will more than match the cost of the recent wage increase.

Steel Production

June

BY TYPES	Millions of Net Tons (0 1 2 3 4 5 6 7 8 9 10)		% of Capacity	Index†
		1955*		
		1954		
TOTAL	9,735,000		94.0	141.4
	7,363,634		72.0	107.0
Openhearth	8,761,000		96.6	141.3
	6,702,006		74.7	108.1
Electric	690,000		77.6	199.6
	453,962		52.8	131.3
Bessemer	284,000		72.1	83.5
	207,666		52.7	61.1

Source: AISI *Preliminary Figures

†Index of production based on average production of the three years 1947-1948-1949.

HOOVER: Shows How to Save Billions

Reorganization commission puts needle into bureaucracy and inefficiency . . . Adoption could save $25 billion . . . Needs backing from industry . . . Congress hates change—By *N. R. Regeimbal.*

MOUNTAINS OF PAPER testify to the volume of paper work done during the Commission's lengthy study of Govt. In all, 8 years were involved.

◆ HOOVER COMMISSION on Government Organization, after two years of digging through the federal bureaucracy for waste and inefficiency, has planted a bomb capable of exploding into savings of almost $25 billion in tax money plus huge savings to industry and business.

The Commission's work is completed. Need now is for action to light the fuse.

So far, the Commission, after making 350 recommendations for ways to save the time and money of both the government and business, has yet to receive vocal support from industry.

Some 75 bills covering 53 subjects are already introduced in Congress. More are coming. Of the 145 recommendations for administrative action by agencies and departments, some 70 measures have already been put into effect by the Administration.

But there is strong opposition to many recommendations. Especially from bureaucrats who want to protect their own jobs and prestige, and congressmen who are all for economy—except in their own districts.

Won't Change

In winding up the Commission, former President Herbert Hoover, points out that many wasteful methods are "due to the tenacity of government agencies to the idea that their empires are sacrosanct. . . . Some are due to the pressure groups that profit from the present setup of these agencies and resent all change."

Breakdown of the monetary savings which could result from the Hoover Commission study shows that elimination of duplication and wasted effort would bring almost $8 billion a year in savings. Proceeds of the sale of property and capital equipment, including many industrial-type plants competing with private industry, would bring another $15 billion into the treasury, and further reduce tax requirements.

May Cut Taxes

In addition, the Commission finds that a monetary savings would result from ending government competition with business; revamping Defense Department business organization and procurement; tightening up intelligence activities, and establishing a water resources and power policy. But it did not attempt to estimate how much money might be involved.

If recommendations of this Commission receive the same support that followed those of the earlier group, about 75 pct will be adopted. Adoption of the suggestions would permit a balanced budget and a healthy tax cut next year, the Commission believes. But in addition, it would save industry huge sums through reduced paperwork and bookkeeping and less control of business, and would permit more efficient operation of business.

Agencies Criticized

Findings and recommendations of the Commission during the study range from reducing government competition (there are more than 2000 government activities competing) to eliminating mountains of unnecessary reports and paperwork.

Laws and procedures under which 104 different agencies operate were singled out for particularly severe criticism.

SCRAP: Rebounding Market Fools Many

Prices break upward after slow spring season . . . Early price losses had dried up supply sources . . . Upswing finds brokers scrambling to cover orders . . . No immediate slump is in sight.

◆ AFTER a sluggish spring, the scrap market broke upward in the middle of last month and is now really surging. The steel strike settlement and the continued strong demand for steel have contributed to a market rise that has been in the making for some time.

Here's what's happened:

Over a period of several months consumers kept dropping their prices and brokers were forced to go along. This dried up primary sources of dealer scrap. Dealers themselves contributed to this by dropping their prices to collectors and small industrial plants more than they should have. Even those dealers who didn't go too far in this respect were taking in less scrap than they would have if the mills had not knocked their buying prices so drastically.

Mills Bought Heavily

As a result of all this, the supply of scrap in dealers' yards dwindled.

At the beginning of June, mills in Pittsburgh district came in for heavy tonnages at a price of $35. They spread these orders around to a lot of brokers. That was fine for the dealers. They sat back and let the brokers knock themselves out trying to round up scrap to fill the orders.

The brokers kept raising their prices and the scrap trickled out of the dealers yards. A lot of brokers are losing money as a result. Latest mill purchase in Pittsburgh was for $40, and the next day brokers were bidding $40 to dealers, meaning they were barely splitting even on the latest order. Some brokers are holding $35 orders and stand to lose at least $5 a ton if they fill them.

On top of everything, the industrial scrap supply is dwindling, even though automotive is going pretty good. Latest automotive lists were bid way up. Plant vacations are off this year but there are enough plant shutdowns to reduce industrial scrap supply and further tighten market.

Then don't forget that the steel strike hurt blast furnace production and that put more of a burden on scrap. The mills are pressing for continued high steel production and scrap is important—even though prices are rising.

Another thing—there is less railroad scrap because the roads are patching up their cars and scrapping fewer than usual.

In the East, recent mill purchases have made it difficult to cover oversea commitments and scrap people are tending to hold off on August export orders. Right now, the domestic market is stronger than the export.

Trend in Scrap Prices

As shown by Iron Age Composite Price

STEEL SPECS: Pose Label Problem

Steel producers voice pros and cons of new military specs for marking products . . . Seek standardized, economical method in putting order into effect . . . Ruling covers 70 types of steel—By K. W. Bennett.

◆ "THEY'VE LAID AN EGG—but will it hatch?" Thus a veteran steelman last week characterized the new military specification (June 23) for continuous marking of steel products. The general off-the-record consensus: hatch or not, somebody had laid an egg.

Primarily at Air Force instigation, the Federal Government has been seeking to encourage a universal steel marking system for 14 years. Military Standard 183, providing for continuous marking down the length of a steel product and at widths not to exceed 6 in., is the result. Markings would include the manufacturer's trademark, and a "commercial designation" that would contain a material designator (most commonly the AISI number) and a condition designator (CD for cold drawn, CR for cold rolled, SA for spheroidize annealed, for example). Mil-Std 183 is a start, is to be followed by a more detailed spec in 60-90 days.

"I think your marshmellow's done now, Herb."

Idea Is Good

Most agree that continuous marking is an excellent plan. The question is, how do you do it? Some stainless tube, some 4130 aircraft quality strip, some stainless sheet, and grades of alloy bar are being marked for aircraft consumption, purple ink being used. But what applies to small lots of specialty steels of peculiar surface does not apply to mass produced low carbon steels that are usually coated with a light oil as they leave the finishing mill. And here lies the rub.

At least one warehouse has attempted continuous marking of carbon steel bar on an experimental basis by cleaning the stock, marking it and then reoiling, and found the cost prohibitive. One bar mill has used continuous marking tape on bar stock, but again the bar has to be cleaned before the tape is applied. Costs are high, and the cleaning process isn't always proof positive that the tape will stick. Conversely, tape seems to be about as good a continuous marker as is available. Customers don't like paint, particularly in bar stock. So far, steel makers who have tried inks, dies, and even offset printing with carbon steel, aren't happy with the results.

A further criticism not heard often at the distributor level but more common among mills: will the customer like assembling his product and then marketing it with somebody else's trademark splashed across every untreated steel surface? The feeling among customers still exists to a limited extent that they would prefer to buy their raw materials unmarked, that the only trademark on the end product should be the fabricator's. In a market as limited as military steel purchasing this isn't a major drawback, but is a factor.

Hand marking has been done on pickled material, but in most cases marking of carbon steels hasn't been done on a heavy production basis.

Military Standard 183 covers some 70 grades and types of steel, ranging from graphitic bars, corrosion resistant and alloy steels, stainless, carburizing steels, seamless and welded carbon tubing, on through galvanized and black plate.

The steel industry agrees that a desire to mark military steels can be entirely justifiable from the military point of view. All that producers are asking is an accepted method that will be at least somewhat economical.

What's the Feeling on Military Standard 183?

- **Most steelmen agree that continuous marking of steel products is an excellent plan. The question is: how do you use it?**
- **Different types of markings for specific products have been tried—but what works out well with one — doesn't necessarily work well with another.**
- **Right now, producers are looking for an accepted marking method that will be at least somewhat economical.**

SPLATTERED bullets turned back by armored vest include U. S. Army .45 cartridge and the deadly dum-dum.

PRODUCTION

VESTS: Armored Style Returns

Protective clothes were lifesavers in Korea . . . Army favors fabric type . . . Civilian models use steel plate, afford sturdy defense against hand weapons.

REAL BULLETS are being fired at this man. He is testing an armored vest and vest maker Bernard Spooner is doing the shooting. Bullets dent steel plates of vest but don't penetrate. Police find protective clothes vital items. Armed forces made wide use of them.

◆ OUTBREAK of Korean fighting sent the armed services scrambling for an ancient device: body armor. Protective vests were rushed to the combat area where they deflected 65 pct of all missiles striking wearers and reduced deaths from thoracic wounds by 55 pct.

Usefulness of body armor stems from that fact that guns and bombs spray large areas with incidental shrapnel. Modern military armor is mostly the fabric type. A laminated nylon vest weighs about 8 lb and is flexible enough for active fighting. It won't stop heavy caliber bullets but it will deflect the small fragments which have proved so deadly.

STEEL PLATES are inserted in vest by Bernard Spooner. Plates weigh about 8 lb. but stop direct hits.

Armored garments for civilian use are something else again. Like the flak suits of World War II, these actually contain metal plates, and are offered as bullet proof in their use range. Bernard Spooner of New York, who patented his first bullet stopper in the stirring days of early prohibition, makes vests ranging from 8 to 12½ lb.

PATTERN is carefully followed in cutting front and back sections of vest that will protect full torso.

STILL STANDING, test model displays nylon encased steel vest. Garment fits under street clothes.

Use Nylon

Designed for law officers and others with a sense of insecurity, Spooner vests cover front and back from neck to the waist. Regardless of weight, the vests can be worn under street clothes if a false shirt front is worn. The Shah of Iran is a Spooner patron. Syngman Rhee has two vests.

Steel plates are mounted in a nylon duck fabric in the Spooner vests. Plate sizes vary. Biggest is 4 by 7 in. It weighs 5 ounces and is .040 in. thick. Vests have stopped 30-30 Winchester bullets at 200 ft. but are ordinarily tested with a 357 Magnum cartridge at 15 ft.

Weight, strength and coverage are considerations that guide the armor maker in his work. The knight on his horse had head-to-toe protection but had to be hoisted aboard. If the development and war pace continue at current rates, the well dressed business man of tomorrow may go forth in a double breasted steel outfit.

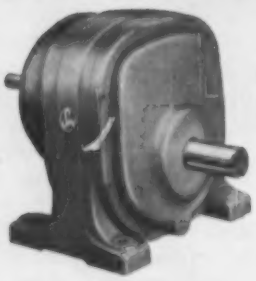
FOR GREATER FLEXIBILITY IN DESIGN MFR. CHOOSES

STERLING SLO-SPEED!

Slo-Speeds' universal mounting features permit flexibility in conveyor design to meet requirements for space, inclines, declines, etc.; the efficient motor and rugged gear system assures dependable, efficient operation and minimum maintenance; the low output shaft minimizes stresses on equipment; the streamlined design is easy to keep clean and improves the appearance of our equipment, reports Francis Curtis, Assistant Chief Engineer, Packing Equipment Div., Food Machinery & Chemical Corp.

STERLING SLO-SPEED GIVES YOU THE ONE BEST LOW SPEED AND gives uninterrupted service—carries heavy overhung loads—provides versatile mounting and flexibility in arrangement of machinery—saves valuable space—provides greater safety—costs less to install and use. An indispensable source of low speed power for:

Agitators	Dryers	Presses
Blenders	Feeders	Pumps
Blowers	Kilns	Screens
Conveyors	Mills	Tumblers
Cookers	Mixers	Etc., etc.



MULTI-MOUNT REDUCER

Available with feet or footless, face or flange mounted.

SEPARATE MOTOR SLO-SPEED REDUCER

For applications where separate motor reducer combinations are desirable.

WRITE FOR Application Bulletin showing how Sterling Electric Power Drives increase production efficiency and reduce costs. Ask for Bulletin No. 202-A.

STERLING ELECTRIC MOTORS

Plants: New York City 51; Chicago 35; Los Angeles 22; Hamilton, Canada; Santiago, Chile

Offices and distributors in all principal cities

NEW ERA: Atoms For Electricity

General Electric makes first sale of atomic-electric power to a private company . . . Others may buy later . . . AEC will receive 3 mills per kw-hr . . . Ceremonies mark historic occasion.

◆ FIRST SALE of atomic-electric power to a private firm will be made shortly from atomic energy produced by General Electric Co., Schenectady.

The energy will come from a prototype submarine reactor at West Milton, N. Y., and will be fed into the power system of the Niagara-Mohawk Power Corp.

Steam from the reactor will be channeled into a 10,000-kw turbine generator to be installed and operated by GE. Arrangement with Niagara-Mohawk is temporary, pending tests to determine whether three other power firms within a 100-mi radius of the plant can transmit the power.

The Atomic Energy Commission will receive 3 mills per kw-hr for the power, on an interruptible basis as tests on the reactor progress. The reactor is a prototype of the one which will power the nation's second atomic-powered submarine, "Sea Wolf," scheduled for launching this week.

Price Set

AEC has pointed out that the 3-mill price per kw-hr was set after studying public power companies' recommendations and after consulting with the Federal Power Commission. It added further that the West Milton reactor will be operated by GE at no cost to the government.

The quantity of the atomic-electric power, in terms of kw-hr, is enough to supply the lighting needs of 35,000 average homes. It also has been described as sufficient for the power needs of a city of 20,000 population, depending on industrial requirements.

Ceremonies marking the dawn of a new era in commercial application of atomic energy at the West Milton site included attendance by AEC Chairman Lewis L. Strauss and GE President Ralph J. Cordiner.

Scientifically and industrially the scene presented was unique in that located in the same installation were the reactors—or "engines"—for both the "Sea Wolf" and the commercial atomic energy electric plant. The one is the first of its type for use at sea, and the other, the first for use on land.

Just where the power will be consumed is still a question.

Disaster:

Say insurance plans can cover reactor damage.

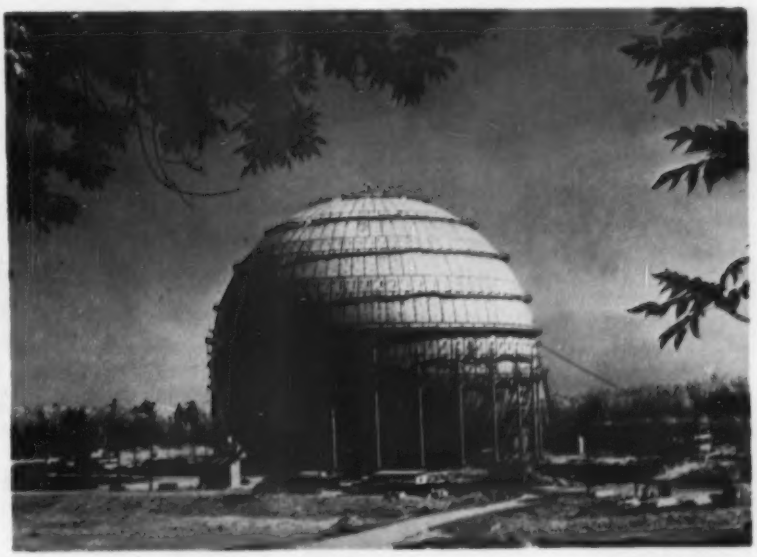
Control measures developed by the growing nuclear energy industry greatly reduce the chances of serious disaster in this field, a 10-man group of insurance executives reports.

Even if there is a reactor failure the precautions taken to contain the results should prevent widespread damage and loss of life, the group says. Its members have worked with the Atomic Energy Commission since March to explore insurance problems created by greater industrial use of the atom.

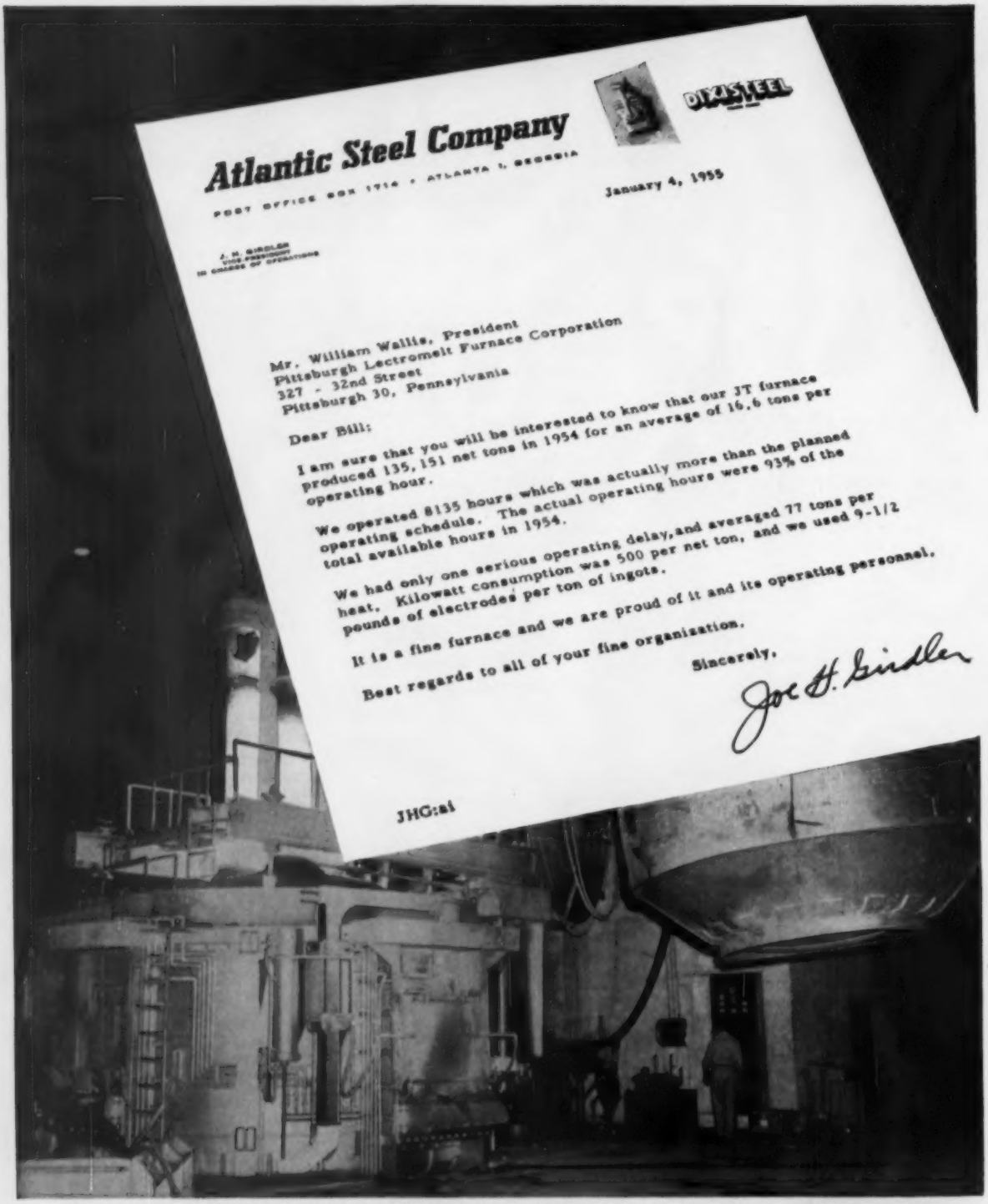
Neighbors Worry

The executives acknowledge that the potential for catastrophe but for insurance coverage alone they believe the insurance business can produce a workable limit of liability for all persons and firms concerned.

One undecided question is whether insurance companies have the capacity to provide coverage for reactors built near large, conventional-type industrial plants. Proximity is an important factor, for more isolated reactors probably can be covered much like the more perilous forms of chemical plants. Present insurance covers liability.



RISING 18 STORIES, 3850 tons of steel sphere houses prototype of A-power plant. Ball is made of inch thick welded steel plate.


Atlantic Steel Company
POST OFFICE BOX 1716 • ATLANTA 1, GEORGIA
J. H. GIRDLER
VICE PRESIDENT
IN CHARGE OF OPERATIONS
DI-NAS-STEEL
January 4, 1955
Mr. William Wallis, President
Pittsburgh Lectromelt Furnace Corporation
327 - 32nd Street
Pittsburgh 30, Pennsylvania
Dear Bill:
I am sure that you will be interested to know that our 3T furnace produced 135,151 net tons in 1954 for an average of 16.6 tons per operating hour.
We operated 8135 hours which was actually more than the planned operating schedule. The actual operating hours were 93% of the total available hours in 1954.
We had only one serious operating delay, and averaged 77 tons per heat. Kilowatt consumption was 500 per net ton, and we used 9-1/2 pounds of electrodes per ton of ingots.
It is a fine furnace and we are proud of it and its operating personnel.
Best regards to all of your fine organization.
Sincerely,
Joe H. Girdler
JHG:al

Manufactured in... GERMANY: Friedrich Kocks GMBH, Dusseldorf... ENGLAND: Birlec, Ltd., Birmingham ... FRANCE: Stein et Roubaix, Paris... BELGIUM: S. A. Belge Stein et Roubaix, Bressoux-Liege ... SPAIN: General Electrica Espanola, Bilbao ... ITALY: Forni Stein, Genoa. JAPAN: Daido Steel Co., Ltd., Nagoya

*REG. T. M. U. S. PAT. OFF

WHEN YOU MELT... MOORE RAPID *Lectromelt*

HITCH-HIKE technique for long range sallys is demonstrated as Republic RF-84F Thunderflash is loaded into belly of giant GRB-36 bomber.

DOUBLE THREAT: Fast moving Thunderflash is carried to combat area by long range GRB-36 bomber. The small reconnaisance plane can then be turned loose. Planes can take off separately, rejoin in air; or leave together.

Boeing Gets Go-Ahead

Boeing Airplane Co., Seattle, its jet transport production plans now approved by the Air Force, expects to have the first of these speedy aircraft ready for commercial lines early in 1959.

Air Force Sec. Talbott says he is satisfied that the plane company will turn out the KC-135 jet tanker for military use on schedule while building the civilian version. Since July, 1954, when Boeing first flew the tanker-transport, the Air Force had refused the company's plan to start work on the commercial transport.

Some 200 of the 550-mph tankers are reportedly on order for delivery to the strategic air command. They will be able to hold formation with and refuel long-range bombing planes.

With the go-ahead from Sec. Talbott, Boeing is looking for buyers for the forthcoming transport. The firm had made preliminary proposals to a number of airlines while waiting for the Air Force to act.

Grant Tax Aid

Certificates of necessity permitting fast tax amortization of 30 new or expanded facilities valued at $104 million have been granted by the Office of Defense Mobilization in the 2 weeks ending June 29.

Three largest certificates go to: Southern Pacific Pipe Lines, Inc., San Francisco, 40 pct of $3.2 million and 25 pct of $25.9 million allowed fast tax benefits for petroleum pipeline; Panhandle Eastern Pipe Line Co., Kansas City, 25 pct of $24.6 million for natural gas transmission facilities; and New England Portland Cement Co., Rockland, Me., 45 pct of $13.5 million allowed for cement plant facilities.

Plan New Plane

Four aircraft manufacturers are designing a new high-performance observation-reconnaissance plane for the Army and the Marine Corps.

The firms—Cessna, Fairchild, Hiller, and North American Aviation—are to report their designs to the Navy by December 31. The Navy, which let the four contracts, says they total $250,000.

Eventually, a successful design may resolve into a production contract, the Navy says. New policy stresses full testing before production.

Plan New Tankers

Eight new tankers are to be built and chartered to the Military Sea Transportation Service, Department of Defense. MSTS awarded a contract to United Oceanic Corp., New York, for a 10-year time charter at an average per diem rate of $4024.15, or $4.80 per deadweight ton per month.

Two of the new tankers will be built by Ingalls Shipbuilding Corp., Pascagoula, Miss., and six will be built by Bethlehem Steel Corp.

MSTS plans to let contracts for seven more tankers.

Issue Atomic Permits

The government's new policy of throwing open its "restricted" files to companies and individuals interested in the commercial development of atomic energy resulted in issuance of 81 additional "access permits" during June.

Blaw-Knox Co., Electro Metallurgical Co., and Jessop Steel Co. are those receiving permits.

EXPANSION IN INDUSTRY

Facilities:

U. S. Steel ups sheet and strip capacity at Vandergrift Plant.

U. S. Steel Corp., Pittsburgh, is installing continuous cold-rolled light and heavy gage stainless steel sheet and strip production facilities at its Vandergrift Plant, and is stepping up capacity for these products at its Gary Sheet & Tin Mill plant.

The increased facilities are part of the corporation's general program for greater production of stainless sheets and strip needed for the national defense program.

In addition to the new installations, the program will include moving equipment now being used for finishing hand-mill stainless sheets at Wood works, McKeesport, Pa., to the Vandergrift plant. The move is designed to concentrate rolling and finishing facilities for both cold-rolled and hand-mill stainless at a central location in the Pittsburgh district.

The shift will bring to a close 104 years of steel making at the historic Wood works. No date has been set for closing the site as yet.

When the entire program is completed, the Vandergrift plant will have an annual capacity for producing over 10,000 tons of continuous cold-rolled stainless sheets. Work will begin immediately with completion expected in about 20 months.

Finance Steel Mill

A $7 million credit authorization to help finance purchases of machine tools and steel mill equipment in this country by two Italian firms has been approved by the Export-Import Bank.

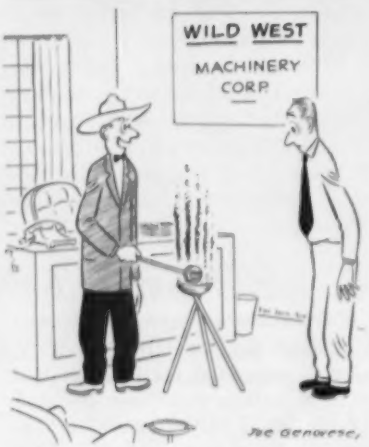
Cornigliana Steel Co. at Genoa, destroyed during World War II, is embarking on a $14 million program to re-establish production of steel products, primarily flat-rolled products and electrolytic tinplate. Ingot capacity after the rehabilitation of the plant will be 750,000 metric tons a year. The firm will use $5 million in Export-Import Bank authorization.

Second credit authorization of $2 million will be used by the Innocenti Manufacturing Co. to buy U. S. machine tools to modernize and expand its mechanical division manufacturing steel mill machinery and other machine tools.

Opens Waste Plant

A $110,000 plant designed for treatment of industrial wastes prior to discharge is being operated by General Electric Co.'s Electric Housewares department at Allentown, Pa.

The new installation, capable of processing 100 gal per min, chemically treats the liquid wastes from the plant's metal plating operations.



"NOW that you've joined our organization, Fred, there's a little formality we have with all our new employees."

Electronic controls, developed by Minneapolis-Honeywell's Industrial Div., automatically regulate the amount of lime and caustic solution fed into the waste to neutralize it.

Additional electronic and pneumatic instruments keep chart records of the chemical content and rate of waste flow into local storm sewers.

Add Blooming Mill

Sharon Steel Corp., Sharon, Pa., has awarded contract for a 44-in blooming mill.

The new facility, with a capacity of 100,000 tons of ingots per month, will be installed at the company's Roemer Works, Farrell, Pa.

Cost of buildings, electrical equipment, soaking pits, and other facilities will be approximately $13.5 million.

Construction will get underway shortly and is slated for completion before July 1, 1956.

Develop Newark Site

Kester Solder Co., Chicago, is increasing its Newark, N. J. plant facilities by more than 50 pct.

A widening eastern market for the company's products, Flux Core Solder and "Solderforms" has sparked enlargement of the Newark plant's manufacturing operations, warehouse and shipping areas.

Grade Foundry Site

Grading for a new aluminum foundry to be built by Anderson Brass Co., Birmingham, will be started within 30 days near Leeds, Ala., on a 19½-acre tract.

The first installation, an all-steel structure, will have 12,000 sq ft of floor space.

In addition to the foundry, the plant will operate some fabrication and heat-treating equipment.

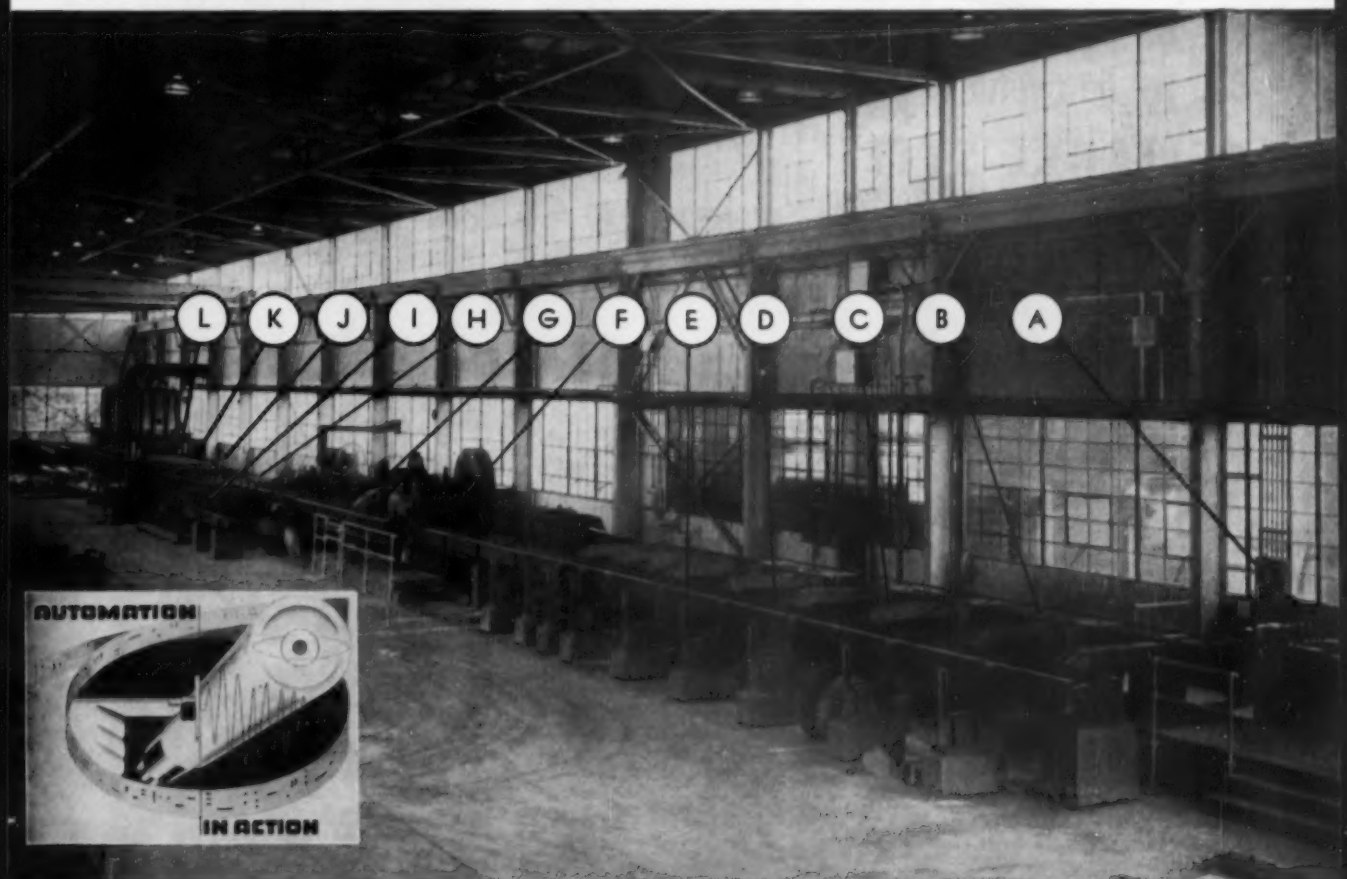
Here's the Fastest, Most Efficient Cold Draw Processing Line Available

The McKay Automated Line that automatically handles and processes hot rolled bars through cold drawing, shearing and straightening in a continuous cycle has proved itself to be far and away the fastest, most efficient cold draw processing operation in action today. Users are finding they can effect great labor savings while actually boosting production, and at the same time get a more uniform product.

Hot rolled, pickled bars are push pointed, drawn, sheared to length, and straightened in a single, continuous operation with no intermediate handling of any type. Hold down and crop gauging on a multiple shear, plus automatic length gauging, permits the shearing operation to keep pace with the maximum drawing cycle. Sheared bars are automatically entered into the straightener which operates at speeds high enough to enable a continuous straight-line flow of bars.

Does the line pay off? Three of four companies now using these lines say they have already paid for themselves and are contemplating the purchase of additional units.

CAN YOU AFFORD TO OPERATE WITHOUT SUCH COST SAVING EQUIPMENT? Remember handling adds nothing to the value of your product. Why not look over the McKay line of automated processing-handling equipment? Why not talk it over with a McKay engineer? There's no obligation.



A—Hydraulic Push Pointer Eliminates pointing prior to drawing. Minimizes point scrap.

B—Multiple Bar Draw Bench One, two or three bars at a time.

C—Horizontal Pneumatic Transfer Arms Takes drawn bars from bench and deposits them on driven shear entry table.

D—Shear Entry Table Conveys drawn bars to the shear.

E—Auxiliary Racks

F—Multiple Bar Shear Has capacity to shear same number and sizes of bars that are drawn.

G—Cut-to-Length Gauge Table Automatic cut-to-length and crop gauges.

H—Shear Run-out Table Driven table conveys sheared bars to straightener entry table.

I—Transfer Skids Entry to straightener table.

J—Automatic Straightener Entry Table Completely automatic feed from transfer skids into straightener.

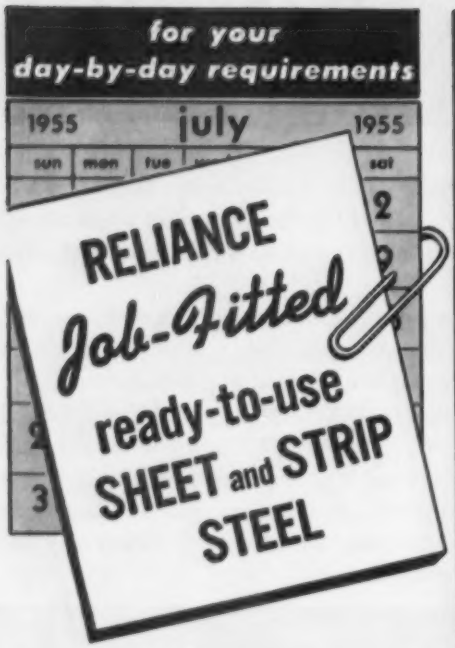
K—Straightener

L—Straightener Exit Table and Racks

The McKAY MACHINE Company
YOUNGSTOWN, OHIO

McK

ENGINEERS AND DESIGNERS OF EQUIPMENT FOR THE AUTOMOTIVE, FABRICATING AND STEEL INDUSTRIES



Can we be useful to you?

RELIANCE STEEL
DIV. DETROIT STEEL CORPORATION

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CLEVELAND PLANT, CLEVELAND 27, O. . VUlcan 3-3600
DETROIT PLANT, DETROIT 28, MICH. . . WEbster 3-5866
EASTERN PLANT, HAMDEN, CONN. . . STate 7-5781
MIDWEST PLANT, CHICAGO 8, ILL. . . . . CAnal 6-2442

Reliance Customer Representative Offices

Dayton, O., Des Moines, Ia., Grand Rapids, Mich., Indianapolis, Ind., Jackson, Mich., Milwaukee, Wis., New York, N. Y., Rochester, N. Y., St. Louis, Mo., Toledo, O., Worcester, Mass.

RELIANCE
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PRODUCTS

COLD ROLLED STRIP STEEL
Coils • Cut Lengths • All Tempers

SHEETS
Cold Rolled • Hot Rolled • H.R. Pickled
Galvanized • Long Terne
Standard or Production Sizes
Sheared or Slit to Actual Working Dimensions

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How a condenser maker
wants *his* DSC STRIP
and gets it . . .
. . . as you can, too

***His* specifications**
THICKNESS: .0105″ ± .0005″
(closer-than-standard by 50%)
TEMPER and FINISH: Dead Soft with just enough skin pass to produce a light, satiny surface

•

Each of these "specs" is important in itself. But it's the way they work in combination that makes the job. Here's why:

The strip is rolled 20¼″ wide and slit into various widths. It is fed automatically through close-fitting progressive dies of intricate design. Press speed is close to 300 strokes a minute. You can see how even slight variations in thickness and/or temper might cause the strip to jam-up, risking serious damage to expensive tools besides disrupting production. Undue gauge variation might also cause dimensional build-up and hamper the tight assembly operations.

Surface quality is extremely important . . . not "for looks" but for function. In this case, the success of an ingenious hydrogen copper brazing process depends on it.

DSC Strip is giving this customer what he wants. How about trying some yourself? We'll welcome the chance to work with you, too.

Customer Satisfaction Is Our No. 1 Job

DETROIT STEEL CORPORATION
GENERAL SALES OFFICE—DETROIT 9, MICHIGAN

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DSC MILL PRODUCTS
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Cold Rolled Carbon Steel Strip — Flat Cold Rolled Carbon Spring Steel
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AND ONLY ALEMITE HAS IT!

Alemite, originator of the lubrication fitting—acknowledged leader in the field—now brings you individually packaged lubrication fittings in handy "strips." You buy as many as you need. They stay clean, undamaged. No more dirty threads, no more clogged fittings! And best of all, no more figuring which fitting is which—no more fumbling around in a box of miscellaneous parts for the fitting you need.

Furthermore, when you order genuine Alemite fittings now—you *know* you get the real thing, because only Alemite has this advanced packaging. Just as only Alemite brings you the design advantages of the original, genuine, Alemite lubrication fitting!

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You can identify fittings at a glance! Saves time yet costs no more!
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You know it's the genuine Alemite fitting when you buy it in this transparent plastic pack. Don't accept a substitute.
AAAAA
Genuine ALEMITE FITTINGS

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A PRODUCT OF SW STEWART-WARNER

NOW

CLAYMONT'S NEW 3000-TON PRESS IS READY TO SERVE YOU!

Produces pressed steel heads in diameters up to 120″

With a head-pressing capacity second to none in the nation, the press is capable of producing elliptical-type heads up to ¼″ x 120″ in diameter and hemispherical heads up to ½″ x 60″ in diameter.

This efficient giant is capable of exerting 6-million pounds of pressure; it stands 68 feet from top to bottom of pit. Its bed opening is nearly 11 feet in diameter.

Because this Claymont press is the most modern press of its type—Claymont Pressed Steel Heads can be furnished to unusually close tolerances.

You can be sure that Claymont Pressed Steel Heads will meet your most exacting specifications.

CF&I

Claymont Steel Products

Products of Wickwire Spencer Steel Division · The Colorado Fuel and Iron Corporation
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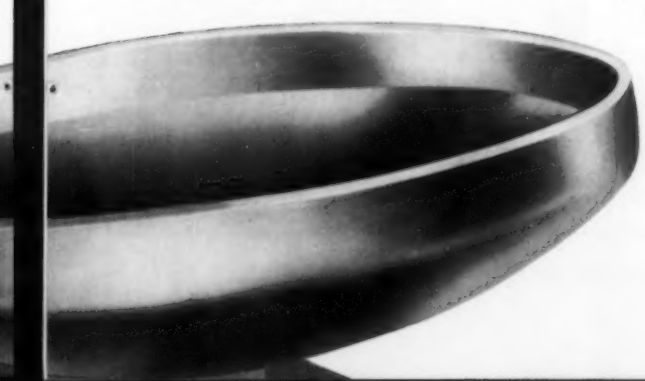
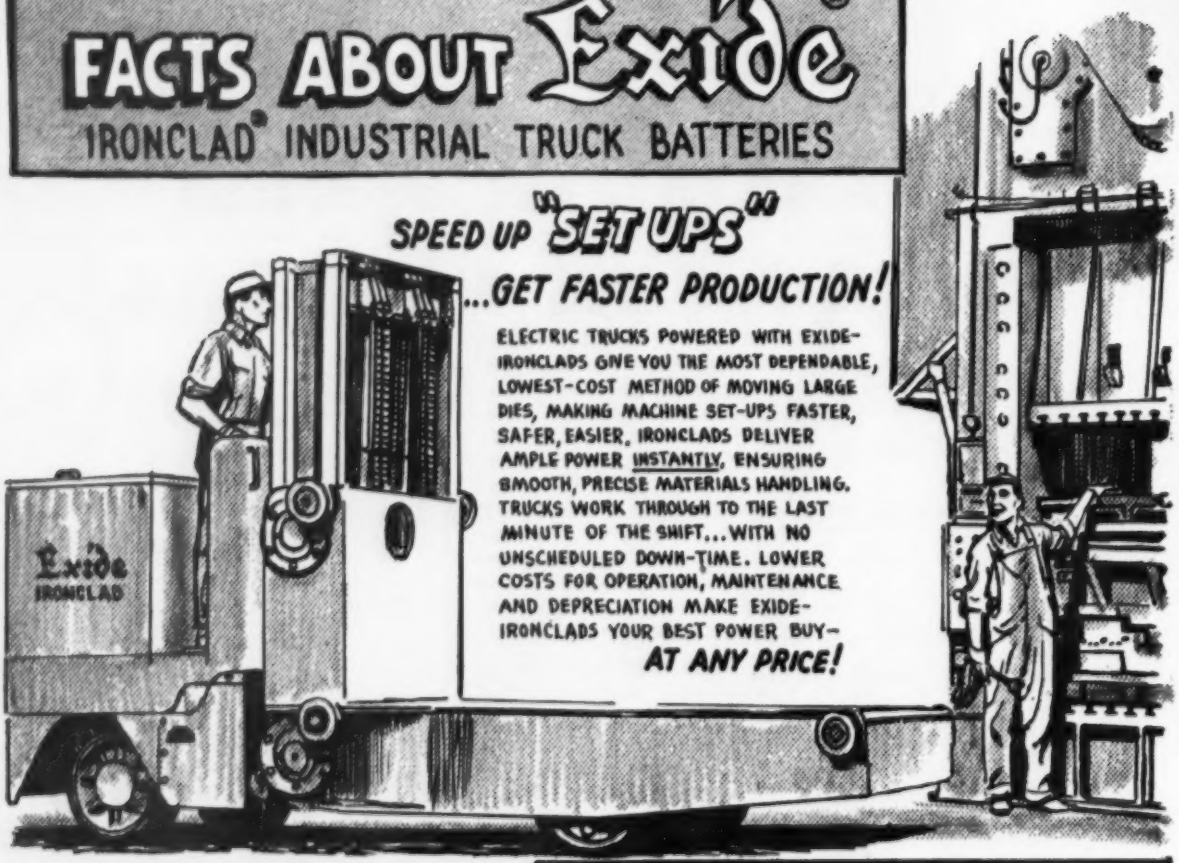


FACTS ABOUT Exide®
IRONCLAD® INDUSTRIAL TRUCK BATTERIES



SPEED UP "SET UPS" ...GET FASTER PRODUCTION!

ELECTRIC TRUCKS POWERED WITH EXIDE-IRONCLADS GIVE YOU THE MOST DEPENDABLE, LOWEST-COST METHOD OF MOVING LARGE DIES, MAKING MACHINE SET-UPS FASTER, SAFER, EASIER. IRONCLADS DELIVER AMPLE POWER INSTANTLY, ENSURING SMOOTH, PRECISE MATERIALS HANDLING. TRUCKS WORK THROUGH TO THE LAST MINUTE OF THE SHIFT...WITH NO UNSCHEDULED DOWN-TIME. LOWER COSTS FOR OPERATION, MAINTENANCE AND DEPRECIATION MAKE EXIDE-IRONCLADS YOUR BEST POWER BUY— *AT ANY PRICE!*

TUBES OF POWER

INSIDE EVERY IRONCLAD ARE SLOTTED TUBES THAT KEEP THE ACTIVE MATERIAL IN FIRM CONTACT WITH CONDUCTING GRIDS OF THE POSITIVE PLATES. THE ELECTROLYTE FLOWS EASILY THROUGH THESE NON-CORRODING SLOTS TO REACH MORE ACTIVE MATERIAL FASTER. RESULT: AN IRONCLAD DELIVERS GREATER POWER... FOR A LONGER TIME... AT LOWEST COST!

● PROTECTED SILVIUM CONDUCTING GRID
COMPRESSED ACTIVE MATERIAL
SLOTTED POLYETHYLENE RETAINER TUBE

LET EXIDE HELP SOLVE YOUR INDUSTRIAL TRUCK BATTERY PROBLEMS. ❶ CALL AN EXIDE SALES ENGINEER FOR FULL DETAILS. ❷ WRITE FOR FORM 1982, A MANUAL ON INSTALLING AND MAINTAINING MOTIVE POWER BATTERIES.

HANDLE MORE TONS PER SHIFT!

EXIDE-POWERED LIFT TRUCKS HELP YOU STACK MORE PARTS FASTER, MAKE FULL USE OF HIGH-PRICED SPACE. IRONCLADS GIVE YOU SPLIT-SECOND TRUCK HANDLING, PRECISE SPOTTING SO THAT STACKING CAN BE HIGHER... AND WITH LOWEST HANDLING COSTS PER TON!

Exide INDUSTRIAL DIVISION, The Electric Storage Battery Company, Philadelphia 2, Pa.

Report To Management

It's a Public Affair

Don't overlook the public's demand for services in making your evaluation of business conditions for the months ahead. Spending that will be done by public utilities and local governments that perform these services is a solid factor in maintaining the current high economic level.

Increasing demands are noted in such activities as public water supplies, power equipment, electrical equipment, public sewerage, and gas and oil transmission for public use.

This is in addition to the demands of "big government" which employs 15 pct of the nation's workers and provides 17 pct of all personal income. These are the day-to-day needs of a population that is building more houses and demanding more facilities.

Here Are the Facts

Furthermore, estimates of increase are being revised upwards for most of these categories. Demand for sewer service will increase construction 7 pct over last year although original estimates saw only a 4 pct rise.

Water service will increase in volume some 14 pct this year compared with initial predictions of an 11 pct jump. These are samples of the utility uptrend listed in a mid-year prediction by the Dept. of Commerce.

Look at Electricity

There's a good reason for financial consultants recommending that their clients buy utility stocks, particularly in electricity. The electrical industry, including the creation and distributing of power, as well as manufacturing electrical equipment, is one of the strongest segments of the economy.

Electric utilities will expand capacity 50 pct before 1960. And there's no reason to believe that this rate of increase will level off then. Requirements of the individual home are providing the big push here, plus the fact that there are so many more new homes, each with its increasing demand for power.

It Means More Appliances

Taking this logic a step further, it means that the appliance industry has good years ahead. This business is intensely competitive, as any discount house frequenter can attest, but volume of sales is high and will go higher.

Almost every household function has been taken over by an electric-powered device. And the number of households that can afford them is increasing every day.

There's Solid Backing

Home construction is the root of this demand. Don't be concerned that this is about to fall off. It isn't.

There is no indication of softness and all indications are that the record pace will continue. Rumors of overbuilding and vacancies are exaggerated or simply just not true in many cases.

Government surveys show the vacancy rate of empty homes awaiting new tenants is only 2.2 pct, compared with 1.6 pct in 1950 when a serious housing shortage existed.

The Funds Are There

There's plenty of cash for corporate spending for capital goods that is expected to provide the stimulus for the second half of 1955.

Working capital of corporations increased this year to an estimated $98.1 billion at the end of the first quarter. Booming manufacturing corporations accounted for three-fourths of the $2.3 billion rise in the first 3 months.

INDUSTRIAL BRIEFS

Mine Sweepers . . . A $1 million contract to construct stainless steel non-magnetic floats for mine sweeping operations was awarded the Portland Copper and Tank Works, South Portland, Maine, by the Bureau of Ships, U. S. Navy. Final shipment of floats will be made in 1957.

Export Know-How . . . Minneapolis - Honeywell Regulator Co. plans to establish a technical training school in England to groom engineers and other technical personnel in the use of automatic control equipment. First class will be comprised of M-H personnel but later plans call for enrollment of "customer" students from West European countries.

Furnace Repairs . . . No. 7 blast furnace at the U. S. S. Homestead Works has been taken out of operation for a complete relining job, scheduled to take approximately 76 days. The No. 3 blast furnace of the Sharon Steel Corp. was lighted following a relining and extensive modernization job. The improvement, costing more than $500,000, will add to Sharon's iron capacity.

Titanium Project . . . Temco Aircraft Corp., Dallas, Texas, has been awarded a subcontract to provide titanium alloy parts for the Air Force's F-100 Super Sabre. Order was received from North American Aviation, Inc., prime manufacturer of the fighter.

Industrial Heating . . . Westinghouse Electric Corp. has formed an industrial heating division to combine the company's induction heating activities, located at Baltimore, and the industrial heating department at Meadville, Pa. Headquarters of the division will be at Meadville.

Adds Tool Co. . . . Negotiations have been completed by the Van Norman Co., Springfield, Mass., to purchase Super Tool Co. with factories in Detroit and Elk Rapids, Mich. Super Tool manufactures a complete line of carbide tools.

Technical Section . . . International Nickel Co. has opened a Southeast States Technical Field Section, Development and Research Div., in Atlanta. The section will furnish industry in the area with technical information and assistance relating to alloys containing nickel.

Stock Sharing . . . Inland Steel Co. is offering 23,750 employees options to buy up to 500,000 shares of stock at $69.75, 10 pct less than the average stock price. Employees who have worked for two years or more for the company will receive options entitling them to buy up to 30 pct of their 1954 earnings.

Buys Division . . . Alan Wood Steel Co., Conshohocken, Pa., has purchased the Steel Equipment Div. of Penn Metal Corp. The division, which manufactures steel lockers, cabinets and shelving, will be operated as the Penco Metal Products Div. of Alan Wood.

Expansion . . . Timken Roller Bearing Co. has appropriated $850,000 for further expansion of the company's Bucyrus plant, bringing the total appropriation of the plant's expansion up to more than $10 million.

Bought Out . . . The Electroweld Steel Corp., Azuza, Calif., has been purchased by Sears Roebuck and Co. at an undisclosed price. The plant will continue to manufacture tubular steel furniture for both Sears and independent Castleton dealers, Electroweld's own furniture sales division.

No Accidents . . . Employees of Lehigh Structural Steel Co., Allentown, Pa., completed a year of 365 consecutive days without a lost time accident June 30. The company actually completed 641 days without a lost time accident on that date, but the National Safety Council year is from July 1 through June.

Triples Production . . . Southwestern Industries, Los Angeles, has tripled production facilities for pressure switches, actuators and gear boxes for aircraft and industrial use with its newly-completed plant in Los Angeles.

New Field . . . Rheem Manufacturing Co., producer of steel shipping container has entered the reconditioned drum field. The company will launch operations on the West Coast.

To our Favorite Boss!

From the receptionist at the front door through to the last man on the loading platform—*all* of us here at Great Lakes Steel have a very important *something* in common. It is the knowledge that your continued and expanded need for our products determines the future and growth of every one of us, regardless of our individual jobs here.

It is the knowledge that *you*, Mr. Customer, are the boss!

That's why we at Great Lakes are seeing to it that our steel is the kind you have a right to expect from a specialist in flat-rolled products. We know the importance of prompt shipments, top quality, proper packaging and loading, dependable information, and clerical accuracy. We think you'll agree that our many satisfied customers are a pretty good indication that this policy is good business for all concerned.

Next time you have a problem in steel, call on one of our representatives to help you solve it. You'll be glad you did!

GREAT LAKES STEEL CORPORATION
Ecorse, Detroit 29, Mich. • A Unit of
NATIONAL STEEL CORPORATION

SALES OFFICES IN BOSTON, CHICAGO, CINCINNATI, CLEVELAND, HOUSTON, INDIANAPOLIS, LANSING, LOS ANGELES, NEW YORK, PHILADELPHIA, PITTSBURGH, ROCHESTER, ST. LOUIS, SAN FRANCISCO AND TORONTO

Tough Testing Builds Better Cars

New Ford proving ground will be one of the largest . . . Cars will get rough treatment over speed and endurance tracks . . . New crash studies aid safety . . . Seat belts offered—*By T. L. Carry.*

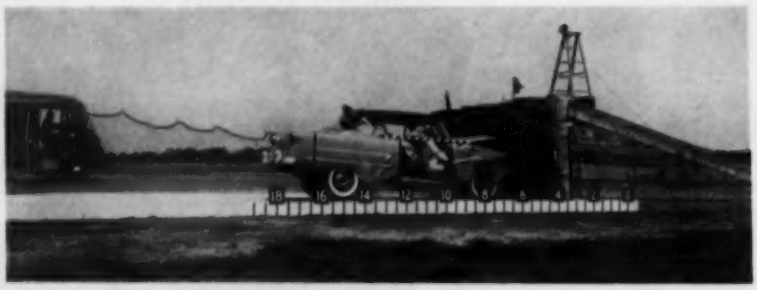
◆ THE RECENT addition of 68 acres to the Ford Motor Co. Michigan Proving Ground near Romeo makes the new testing site, presently under construction, one of the largest in the United States. When completed in September of 1956, the new facility will take in some 4000 acres and the latest methods for road testing automobiles will be used there.

The Michigan Proving Ground is part of a $100 million expansion and modernization program of the Ford Engineering Div. In addition to the Michigan site, the company has just opened a testing facility near Kingman, Ariz. and also maintains other proving grounds at Ford Engineering headquarters in Dearborn and Jennerstown, Pa.

Used Highways . . . The new Michigan testing site will not replace any of Ford's existing facilities. Because of the company's rapid expansion since the end of World War II, engineers have been forced to test cars on public highways for lack of space.

This was not only a safety hazard because of the crowded public highways but the company also found that conditions of the roads varied from time to time. For example, one of the best roads being used for a shake test was suddenly turned into a smooth boulevard and thus was utterly ruined for testing purposes.

In addition, Ford was reluctantly forced to expose experimental models to public view. To get around this, the vehicles either were disguised or the tests were run at night.



FORD CRASH car smashes into a wooden barrier in a controlled crash. Scales and instruments yield valuable data for safety studies.

When the new proving ground is completed, most of the testing operation will be taken off the public highways. At the Romeo site, it will be possible to run tests at any speed desirable without endangering life. Experimental cars can be kept relatively secret. The good roads will be maintained in good condition and the bad roads will stay bad.

Big Staff . . . Ford plans to run 75 pct of its road tests at the new facility. To do this, the site will include a 5-mile high speed test track capable of accommodating cars at the unlikely speed of 140 mph. There will also be a 2-mile straightaway for high speed testing. All kinds of driving conditions will be simulated on a network of dirt, gravel, blacktop and concrete roads. Cooling and braking systems will be put through the paces on grades varying from 15 to 45 degrees.

Some 400 people, including drivers, mechanics and laboratory personnel will be employed at the site when it is completed. Present plans call for operations to be conducted on a continuous 24-hour basis.

Crash Tests . . . In conjunction with the expanded testing facilities, Ford has just started a safety research program to see how it can reduce the number and severity of traffic accidents.

Several crash tests with lifelike dummies in the cars have already been conducted at the Dearborn Test Track. The dummies used in the tests are made as lifelike as possible.

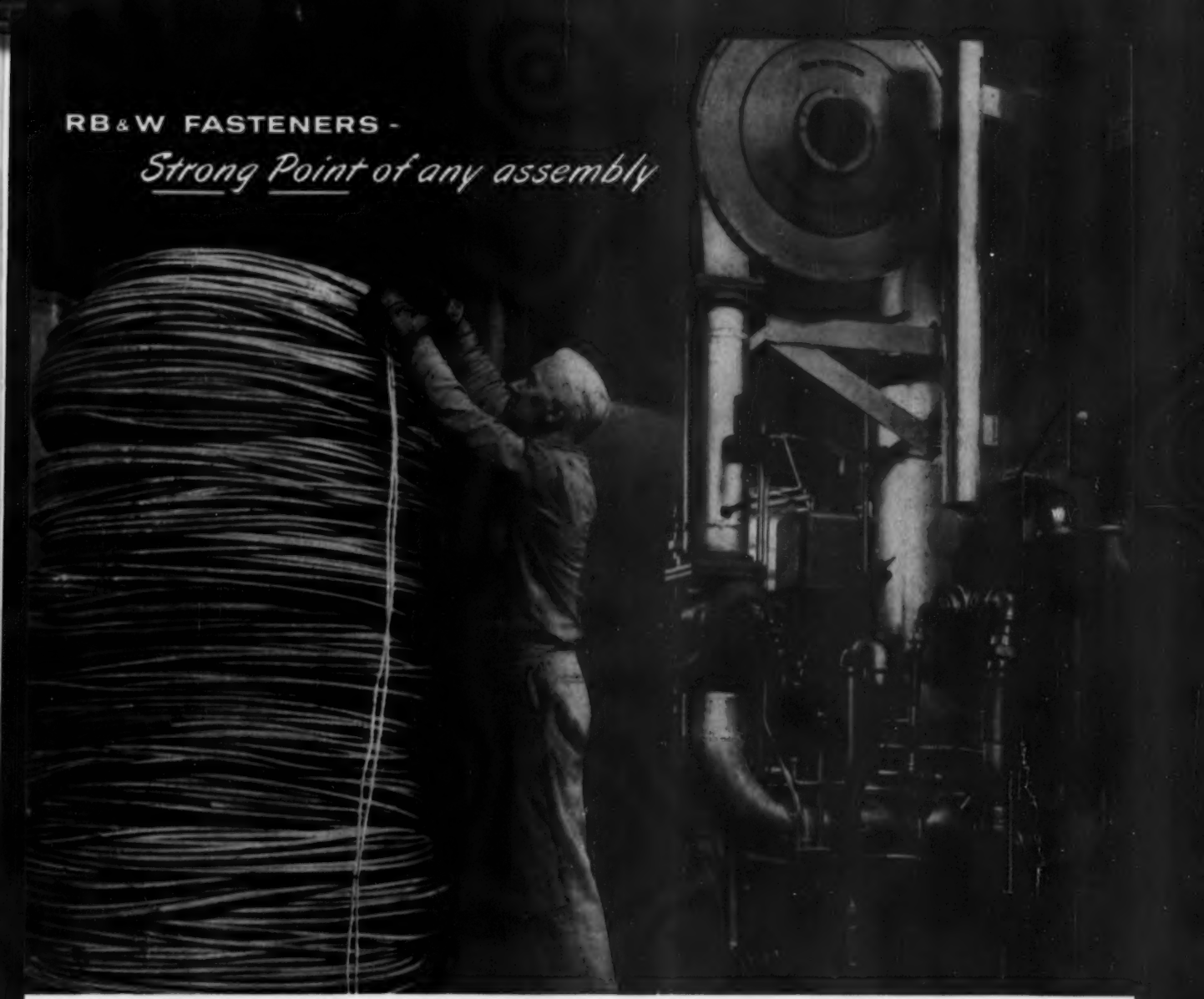
Skeletons are constructed of steel and skin and muscle are made from soft plastic. They can also be adjusted so that they can be either relaxed or tense at the point of impact. Electronic devices are attached to the dummies so that the force of the blows they receive in a crash can be recorded.

In a typical test a car is towed at a predetermined speed into another vehicle or a heavy timber barrier. Results are recorded by a special instrument van.

Specialized laboratory impact tests are correlated with the crash

RB&W FASTENERS -

Strong Point of any assembly



Where the heat's on to lift bolts and nuts out of the ordinary

You won't see these spheroidizing furnaces in many bolt and nut plants. They call for a big investment of money. But to a company that wants to be sure of conditioning metal for the best bolt and nut possible, they're worth it.

In the photo above, you see R. M. Hubley setting up to anneal coils of wire rod to change its structure for the better. Next, he'll hoist the furnace at right, setting it down over the stacked coils. This special equipment makes it possible to accurately control the heating, cooling and the atmospheric conditions inside the housing.

Working with the most modern and complete facilities, RB&W men can bring to bear the full extent of their experience. And experienced they are . . . most have long years of service in the company. Some have followed their fathers' and even grandfathers' footsteps.

It's this combination of equipment, experience and quality control throughout RB&W plants that assures you more quality for your money . . . a reliable source of supply . . . and strong fasteners that never let you down.

Russell, Burdsall & Ward Bolt and Nut Company, Port Chester, N. Y.

R B & W

110th year

Plants at: Port Chester, N. Y., Coraopolis, Pa.; Rock Falls, Ill.; Los Angeles, Calif. **Additional sales offices at:** Ardmore (Phila.), Pa.; Pittsburgh; Detroit; Chicago; Dallas; San Francisco. **Sales agents at:** New Orleans; Denver; Seattle. **Distributors** from coast to coast.

EXTRA POWERFUL

...to level off "production peaks!"

The Fellows No. 4GS Gear Shaper safeguards your schedules at production peaks—keeps gear costs on the down grade.

Just as you can rely on the extra horsepower in your car when the going gets tough...you can rely on the modern, powerful machine tool to carry your production over peak periods when the schedules are tight.

The All-New Fellows No. 4GS is a powerful, rigidly constructed machine tool that can remove stock FAST...finish-cut gears more rapidly and within closer tolerances than ever before.

Features rugged drive mechanism to match its 3⅜" cutter spindle! Reciprocating cutter speeds from 98 to 635 strokes per minute! Rotary feeds from 0.008" to 0.024" based upon 4" p.d. cutter! Ideally suited for automatic loading and unloading in the smaller size range...complete production cycle! CAPACITY: 6" p.d. x 2" face!

Contact
any Fellows Office for complete machine data and information about the Fellows Plan for deferred payment!

THE Fellows GEAR SHAPER COMPANY

Head Office and Export Dept., 78 River St., Springfield, Vt.

Branch Offices: 319 Fisher Bldg., Detroit 2, Michigan • 5835 West North Avenue, Chicago 39, Illinois
2206 Empire State Bldg., New York 1, N. Y. • 6214 West Manchester Avenue, Los Angeles 45, California

Automotive Production

(U. S. and Canada Combined)

WEEK ENDING	CARS	TRUCKS
July 16, 1955	176,736	29,972
July 9, 1955	143,400	23,888
July 17, 1954	111,039	19,718
July 19, 1954	90,323	15,846

*Estimated Source: *Ward's Reports*

experiments. Technicians study design features by dropping heavy weights on various parts.

First result of the program showed the value of installing seat belts in cars. Ford is the second company to offer seat belts as optional equipment on its cars and trucks.

New Air Conditioner

Packard Div. of Studebaker-Packard Corp. has developed a new air conditioning system for installation in its luxury line of cars. Regardless of the outside temperature, Packard claims the new system will cool the inside of the car to a comfortable level within 90 sec.

Packard was one of the first companies to pioneer in automobile air conditioning units. Introduction of the new system is another step in the division's efforts to recapture its former position in the luxury car field.

Located under the hood, outlets for the thermostatically controlled unit can be placed either in the instrument panel or at the floor level.

Labor:

Smaller companies fight pattern.

Veteran labor observers here look for the new contract between the UAW-CIO and Chrysler Corp. to be settled long before the Aug. 31 deadline. Predictions for an earlier than usual settlement are based on the fact that the groundwork has already been laid in the new pacts with Ford and General Motors.

Chrysler last week made an offer to the union and although neither side would talk about it, the "secret" proposal included a supplemental unemployment benefit plan similar to those won by the union at Ford and GM.

It is also no secret that the union is demanding from Chrysler the same pension, improvement factor increase and other benefits for which Ford and GM settled.

Meanwhile, American Motors Corp. is steadfastly maintaining that it will be economically impossible to follow the pattern set by the bigger corporations last June.

The company claims that its labor costs in some departments are higher than for any of the Big Three. Despite the protests, it's a safe bet that the pattern will be followed, but perhaps to a lesser degree.

Integration:

Chrysler purchase shows auto company trend.

In a further move toward integration of its production, Chrysler Corp. will buy outright the plants, equipment and inventories of the Universal Products Corp. at nearby Dearborn.

Universal Products manufactures automotive drive shafts and their components, including universal joints. The company has been supplying approximately 85 pct of its production to Chrysler.

The transaction is expected to be completed in about 4 months. Final sale is contingent on approval of the company's stockholders. Book value of the 200,000 outstanding shares of Universal stock will be about $43 per share at the time the sale is completed.

The sale involves property with a total floor space of 300,000 sq ft and 14 acres of land. Sale price will be between $3 and $3½ million.

Present plans call for continued production at Universal Products while the deal is being closed so that the flow of supplies to Chrysler and other customers will not be halted. Chrysler plans to supply Universal's other customers once the transaction is completed.

Since the end of World War II, Chrysler has embarked on a program of decentralization.

THE BULL OF THE WOODS — By J. R. Williams

TAKE ME TO TH' WILDS--TO TH' STICKS OR SOME WEEDY DELL--ANY PLACE I CAN GET AN HOUR'S SLEEP! A VACUUM CLEANER SCREAMIN' IN THIS HOUSE, A WASHIN' MACHINE MOANIN' IN THAT ONE, A VEGETABLE GRINDER IN TH' NEXT... LAWN MOWERS... HOT RODS... AND I WORK IN A MACHINE SHOP ON TH' NIGHT SHIFT!
I'LL GET YOU SOME PLACE WHERE I WON'T HEAR YOU YELLING ON TOP OF IT ALL!
7-20 J.R. WILLIAMS
THE TOOL HOUSES

Facilities of...
COMMERCIAL HEAT TREATERS
can cut YOUR costs

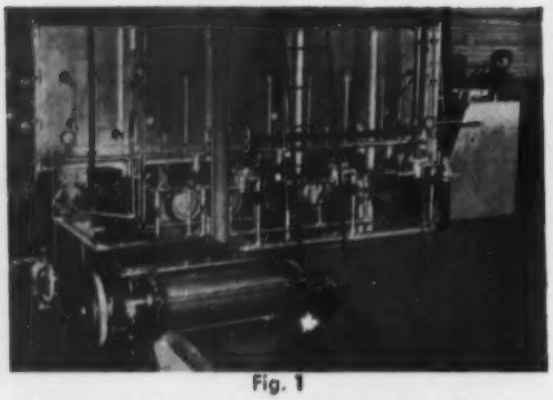


Fig. 1

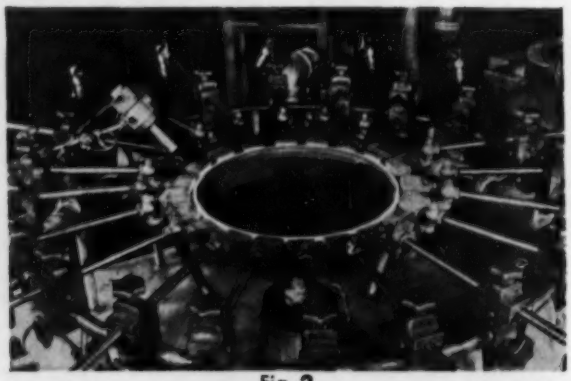


Fig. 2

An MTI commercial heat treater is located near you and is ready to serve your needs by performing "Custom-tailored" heat treating operations.

Because all members of the MTI are specialists with complete service facilities centralized in one plant, they are equipped to offer you a variety of heat treating processes—atmosphere hardening, carburizing, nitriding, annealing, cyaniding, etc.

For example, Fig. 1 shows an installation of a shaker hearth furnace with a continuous automatic quenching tank and a conveyor to a washing machine.

Fig. 2 illustrates a gas flame hardening unit featuring accurate temperature control and using two semi-circular gas manifolds mounted on movable carriages with 20 or more burner heads.

A further example of versatile and dependable equipment found in a commercial heat treating plant is seen in Fig. 3. The specially designed furnace conveyor belt carries over 35 lbs. per sq. ft. in normal service and sometimes as much as 5000 lbs. are loaded on it with pieces ranging from ½ lb. to 100 lbs. and temperatures up to 1650°.

Possessing such equipment together with many other specialized facilities and employing the trained personnel with technical knowledge and experience is the business of the commercial heat treater. Teamwork between you and the commercial heat treater can cut *your* costs.

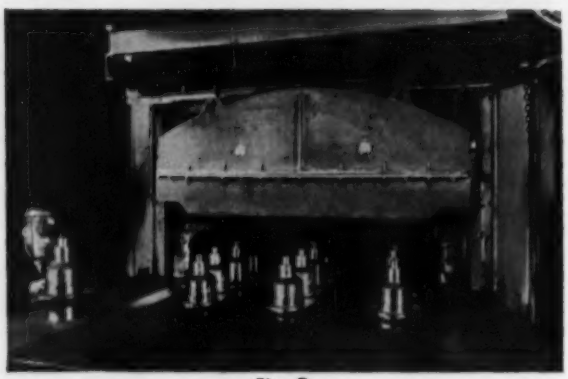


Fig. 3

WRITE FOR *the booklet called:*

"STRATEGIC USE of OUTSIDE HEAT TREATING FACILITIES CAN CUT COSTS."

Consult any of these HEAT TREATING SPECIALISTS

Ace Metal Treating Corp.
Elizabeth, New Jersey

Anderson Steel Treating Co.
Detroit, Michigan

Benedict-Miller, Inc.
Lyndhurst, New Jersey

Bennett Heat Treating Co., Inc.
Newark 3, New Jersey

Commercial Metal Treating, Inc.
Bridgeport, Conn.

Cook Heat Treating Co. of Texas
Houston 11, Texas

The Dayton Forging & Heat Treating Co.
Dayton 3, Ohio

Drever Company
Philadelphia 33, Pennsylvania

Greenman Steel Treating Company
Worcester 5, Massachusetts

Fred Heinzelman & Sons
New York 12, New York

MTI METAL TREATING INSTITUTE

Alfred Heller Heat Treating Co.
New York 38, New York

Hollywood Heat Treating Co.
Los Angeles 38, California

L-R Heat Treating Company
Newark, New Jersey

The Lakeside Steel Improvement Co.
Cleveland 14, Ohio

Metallurgical, Inc.
Minneapolis 14, Minnesota

Metallurgical, Inc.
Kansas City 8, Missouri

Matlab Company
Philadelphia 18, Pennsylvania

Metro Heat Treat Co.
New York 13, New York & Ridgefield, N. J.

New England Metallurgical Corp.
South Boston 27, Massachusetts

Paulo Products Company
St. Louis 10, Missouri

Pittsburgh Commercial Heat Treating Co.
Pittsburgh 1, Pennsylvania

The Queen City Steel Treating Co.
Cincinnati 25, Ohio

J. W. Rex Company
Lansdale, Pennsylvania

Stanley P. Rockwell Company
Hartford 12, Connecticut

C. U. Scott & Son, Inc.
(Stainless Steels)
Rock Island, Illinois

Standard Steel Treating Co.
Detroit 10, Michigan

Syracuse Heat Treating Corp.
Syracuse, New York

Winton Heat Treating Company
Cleveland 16, Ohio

This advertisement sponsored by these Companies which are members of the Metal Treating Institute.

What Did the Defense Drill Show?

Too much lethargy and confusion is Capitol verdict . . . Big new mobilization exercises aim at stirring business and bureaus . . . War games, bigger business role will mark alerts—By *G. H. Baker.*

◆ TOUGH new war mobilization exercises are in the making. They'll be staged in tandem next year with big-scale military war games in an all-out flexing of U. S. defense muscles. Object: To jog slothful bureaucrats and businessmen into alert and useful planning against atom bombs.

The double-barreled "operation alert" is being staged on personal orders of President Eisenhower. Its purpose is to iron out the many wrinkles in Washington's expensive and confused program for running the government under crisis conditions.

Ike Frowns . . . Next year's tests will be a big-scale follow-up to the "operation alert" skirmishes staged by government bureau chiefs in mid-June. Ike has quietly let word leak out that he is "disappointed" at the disorganization and confusion that colored those drills. (Biggest snafu was communications. Telephone and teletype circuits sadly inadequate for the volume of calls placed. "Urgent" messages jammed up for hours in government message centers.)

Business executives will play a greater part in next year's runthrough, if present plans hold. Dr. Arthur S. Flemming, Ike's mobilization boss, wants to tap executives from labor, management, and education for the drill to work side-by-side with government executives.

Debate Dollar-a-Year . . . The future status of "dollar-a-year men" is still up in the air. Leading Democrats are bent on writing a prohibition on these executives who serve the government on "loan" while drawing compensation from their companies.

It is contended that there is "great danger" that the pressure of private interests will be greater than the sense of public responsibility held by the executives on "loan," and suggested that there are too many temptations to "fix" contracts and to throw business to their employers.

Others—notably Defense Mobilizer Flemming and Secretary of Commerce Weeks—say there are plenty of legal safeguards against wrongdoing, and predict that the banning of "dollar-a-year" men would result in turning over important government jobs to persons with second-rate ability, second-rate experience, and second-rate information. The new badgering wave is bound to make good men think twice about U. S. jobs.

Study GAW Laws . . . U. S. Labor Dept. says it will advise state governments whether to permit unemployed workers to draw both wage payments and unemployment compensation. Issue is up in the air at present, with many state legislatures readying bills that make it legal for workers to draw wages on top of unemployment compensation and others taking a "wait-and-see" attitude.

Government labor lawyers admit there is little or no federal angle involved, but they point out that they are ready—even eager—to advise the state governments on state unemployment-aid rules.

Denounce Beer Cans . . . Beer cans are to be produced in fewer sizes, if the government stamps its approval on a proposed federal order.

Breweries, under a proposal now

Drop That Isotope

▪ U. S. Atomic Energy Commission is proposing a set of rules establishing standards for protection of workers and the public against radiation hazards of commercial nuclear projects.

▪ The rules apply to all persons who receive, possess, use or transfer source material, special nuclear material, or by-product materials under a commercial license. They establish maximum permissible limits of exposure to external radiation and concentrations of radioactive material, and maximum permissible levels of radiation in areas to which access is not controlled by the licensee.

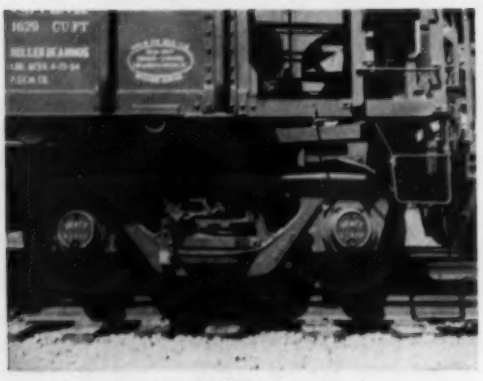
Copies of the regulations are available from the Commission, Washington 25, D. C. Interested persons have 30 days to submit written comments and suggestions to the Commission.

Vital Venezuelan ore speeds on HYATT ROLLER BEARINGS in 1000 ULTRA-MODERN FREIGHT CARS!

1000 tons of iron ore per hour are unloaded from ship, conveyed to car-loading bins

1000 special cars with the most modern devices were purchased by four railroads

Ore moves from Mobile to Birmingham mills on one of the fastest schedules in history



Every car has HYATT Roller Bearings to assure delay-free delivery of the vital ore

Down at the Mobile docks operated by Marine Bulk Handling Corporation, a rich, red flood of high-grade Venezuelan ore pours from a ship's hold almost daily. This is the story of how it speeds from Mobile to the Birmingham blast furnaces of United States Steel's Tennessee Coal and Iron Division.

The job is so big that four progressive railroads—the Gulf, Mobile and Ohio, the Louisville and Nashville, the St. Louis-San Francisco, and the Southern—jointly purchased a fleet of 1000 ultra-modern hopper cars specially designed for this run. One of the most important specifications was *roller bearing journal boxes*—to cut hours from running time, prevent hot-box delays, sharply reduce motive power, lubrication and inspection costs. The only question was what *make* of roller bearings to buy. And after careful comparison the choice was easy: HYATTS! All four railroads specified *free-lateral, easy-to-install* Hyatt Journal Boxes—100%!

Here's proof again that when railroads get *all* the facts about roller bearings, they're wise to choose HYATTS! Hyatt Bearings Division, General Motors Corporation, Harrison, New Jersey.

HYATT

RUNNING MATE OF FASTER FREIGHT

ROLLER BEARING JOURNAL BOXES

being studied by the Internal Revenue Service, will be limited to the so-called standard sizes of cans. These are defined as containers holding 7, 12, 16, 32, and 64 oz.

"Off-size" containers, like the 10-oz can and the fifth-of-a-gallon bottle, would be banned.

Testimony presented to the IRS shows that brewers are divided over the proposal. Some denounce the "off-size" containers as an attempt to get more money for less product, but others maintain brewers must be free to meet the changing desires and habits of the consumer.

Soft-drink canners are free to use any size can. Their sales have zoomed since they began to be heavy buyers of tinplate.

Estimates for 1955 see beer cans claiming 720,000 tons of tinplate; and 4,003,000 tons going into the total can production.

U. S. Will Compete . . . Industry's efforts to get the government out of competition with private enterprise is limping after an almost crippling blow dealt by Congress.

The lawmakers, in working out Senate-House differences in military appropriations, adopted a provision that the Defense Dept. may end a commercial-type business over 3 years old only with congressional approval. Because 3 years covers only the Eisenhower administration, during which the trend has been to stop, rather than start, business enterprises, the provision is almost meaningless. All changes must pass Congress.

Container Sales Jump

Survey of container operations made by the Business and Defense Services Administration shows most segments of the industry completed their January-March output in healthier condition than they were in at the same time last year.

Steel drum shipments, for example, were 6.2 pct higher in the opening quarter this year. Metal and plastic cap shipments were up by 9.9 and 6.8 pct, respectively. Metal can deliveries increased by 3.7 pct. In all, 17 of 23 container categories were shipped in greater quantity during the quarter.

Among groups which fell behind the pace were steel pails and crowns. Pail shipments were 1.7 pct lower, and crowns were off by 6.9 pct.

By the end of April, order backlogs in the industry were generally higher than at the beginning of this year or in April 1954. Of manufacturers responding to the survey, 60 pct reported larger backlogs than were recorded in January.

Export:

New policy bans price tie-up with foreign firms.

Federal Trade Commission is revising its antitrust enforcement policies to prohibit export trade associations from engaging in price-fixing arrangements with foreign competitors.

In a letter to an undisclosed export trade group, FTC warns that a 30-year-old policy permitting such groups to join in any kind of agreement with foreign competitors so long as it does not hurt domestic competition is being reversed.

Shift Policy

The agency warns that if such agreements aren't ended in 30 days, the association's case will be turned over to the Justice Dept. for investigation and prosecution under the antitrust laws.

Under the Webb-Pomerene Act, U. S. firms are permitted to band together for export activities without fear of antitrust prosecution. Until now, the combinations were also free to engage in price-fixing and territory agreements with foreign competitors.

FTC cites recent court cases to support its new decision that such international agreements are not "in the course of export trade" within the meaning of the Webb-Pomerene Act.

I'm afraid there must be some mistake. I ordered a ham sandwich.

Defend Merger Ban

Justice Dept. is basing its opposition to the proposed Bethlehem-Youngstown merger on the grounds that if it permitted the combination, it would be powerless to block other steel mergers in an industry already heavily dominated by one producer.

Attorney General Herbert Brownell, Jr., says the department fears that if it failed to block the Bethlehem Merger, it could not object to a combination of all 23 of the fully-integrated firms smaller than the 10 industry leaders.

He claims that in the case of recent auto company mergers, there was to be no lessening of competition because there were no smaller competitors, so the only result could be increased competition.

Support Excise Cuts

A new tax-cut bill, which would halve the excise tax on room air conditioners, repeal the excise tax on transportation of coal and permit carryover of foreign tax credits, has the support of the House Ways and Means Committee—despite Administration opposition.

Under the measure, the 10 pct tax on room air conditioners would be cut to 5 pct, saving consumers about $10 million a year.

4 ways this new inspection tool may help you

Reduce Product Costs. By eliminating the factor of over-design, a betatron helped one manufacturer. The result was a product far less costly to manufacture. Weight reductions made it easier to install, too.

Save on Raw Material. In less than six months a betatron paid for itself through raw material savings. One example: A simple two-piece welded part could replace a complicated casting because the speed and depth of penetration of a betatron permitted thorough inspection of the weld.

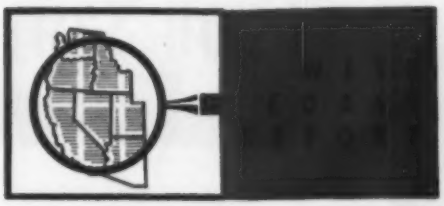
Convert Rejects Into Usable Products. Here's how a betatron helped another manufacturer: by helping to locate flaws exactly, many rejects could be repaired instead of discarded. In addition, by discovering flaws before machining, betatrons can save machine time and man-hours that might otherwise be wasted.

Put Realism Into Guarantees. When every component is proved sound by a betatron, many of the breakdowns that require servicemen's time or expensive replacement will be completely eliminated.

WITH THESE KINDS OF SAVINGS, it is no wonder that many management and operating men are getting information about Allis-Chalmers new inspection tool, the 22-million-volt betatron. It lets you inspect castings or forgings for hidden flaws or alignment of parts quickly and efficiently. It detects flaws only .040 inch deep in a steel section 8 inches thick. Cracks only .002 inch wide are readily detectable.

Get complete information. Consult the A-C office nearest you or write Allis-Chalmers, Milwaukee 1, Wisconsin. A-4548

ALLIS-CHALMERS



Plant Safety Programs Pay Dividends

Alcoa's West Coast plant uses three-man staff to cut accident rate below industry level . . . Employee support is needed to make safety program work . . . Coast air transport industry booms—By R. R. Kay.

◆ YOU DON'T need a large professional safety staff to have an effective company safety program.

It doesn't matter if your plant's large or small, you can help keep your employees healthy and happy. And you save money, too. Here's the plan:

(1) Regular job safety analysis. (2) Thorough accident investigation. (3) Monthly safety meetings for both men and management. (4) Penalties for violations of safety rules.

It's working at Aluminum Company of America's Vernon (Calif.) Works, where a small three-man safety department does the job for 2000 employees. Results: 2.07 accident frequency rate vs nonferrous industry national rate of 8.0. That's good enough for year-after-year top National Safety Council and intra-company awards.

Foremen Help . . . Solid management and employee support is basic, says safety director Frank H. Regehr. Work the four-point plan this way—tailor it to your own shop size:

Get every foreman to analyze safety requirements in his department. Have him list on a card each machine's safety regulations. He should check the card regularly to see that the machine and man working the machine are up to snuff on the safety measures.

Keep a card for each worker, listing the machines he knows safetywise. Check his card before you change his job. You'll be sure to keep him away from unfamiliar equipment.

Learn all you can about every disabling injury. You'll get some hot ideas for safer practices if you question: the injured, witnesses, foreman, supervisor, plant superintendent, works engineer, and safety engineer. Don't skip anyone who might have any idea how it happened.

Study Accidents . . . Men and management should meet at least once a month to talk over safety problems and review accidents. Make it a rule that foremen explain accidents in their departments. You'll find the publicity keeps them on the ball.

If there's a major safety violation, hand out a three-day suspension to the violator. Management and union go along with this, according to Alcoa's Mr. Regehr.

More good tips: Appoint an employee safety committee, members to serve a year. Pick senior workers and union stewards wherever possible. Assign each member to work a different plant area. And you'll find former committeemen active publicists for company safety. Hold committee meetings on company time.

"It isn't often I get a break like this."

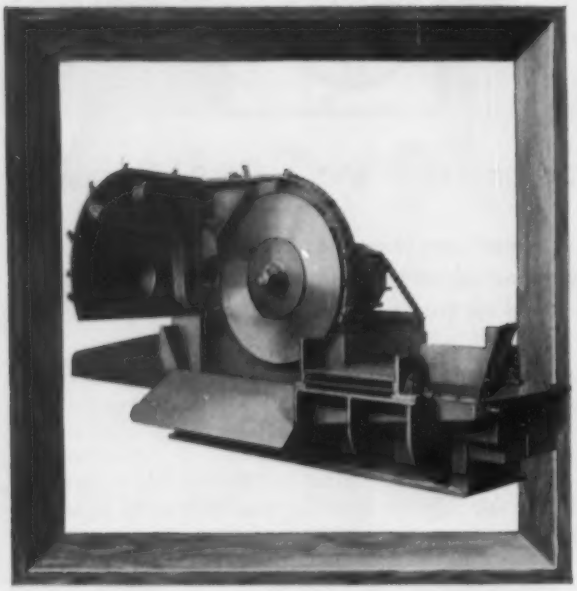
Air Transport . . . Supplying airliner builders? Your future looks mighty good. A 10-year prediction by Lockheed Aircraft Corp.: world air travel will double, reach 72 million revenue passenger miles. It'll take huge fleets to carry this load. And you'll be shipping your materials, parts, and supplies to West Coast planemakers.

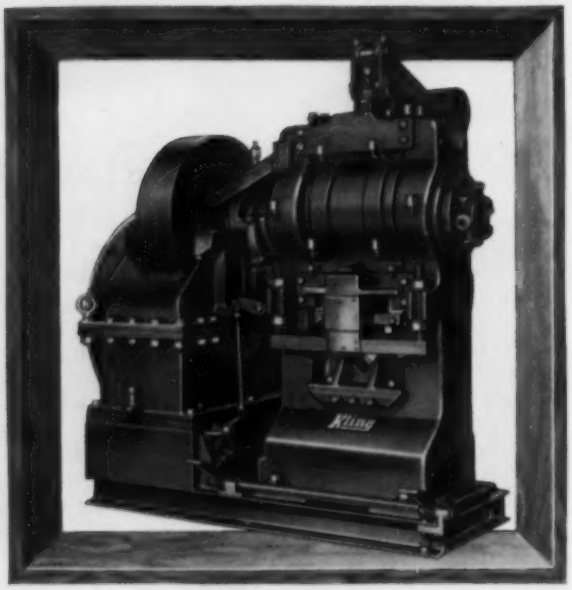
Three southern California companies now make 100 pct of big U. S. transports—selling them to 25 foreign countries in the Free World. They're sitting on some $750 million in transport orders. More is sure to come to: "Convair Div. of General Dynamics Corp., San Diego, Douglas Aircraft Co., Inc., Santa Monica, and Lockheed Aircraft Corp., Burbank.

Don't look for skies to be black with jet transports by 1965. Conventional piston-engine planes will still carry 65 pct of the passenger load—**jets only one per cent.** And turboprop planes will carry 34 pct. That's what Lockheed's market research experts are counting on.

It's a good bet Denver or Salt Lake City will get the new $100-million Boeing Airplane Co. guided missile plant. Company expects to employ about 20,000 to make its Bomarc missile. The Seattle firm took an option on 4000 acres near Salt Lake City. It already has Denver-area options.

Friction Sawing Guillotine Shearing





KLING FRICTION SAWS . . . 10 SIZES (Size 4200 illustrated)
Capacity of this Saw: All standard structural steel sections; all standard steel rails; most steel pipe sections, and many solid sections.

KLING GUILLOTINE SHEARS . . . 5 SIZES (No. 4 Illustrated)			
Tonnage Ratings		#3 Guillotine	175 Tons
#1 Guillotine	85 Tons	#4 Guillotine	250 Tons
#2 Guillotine	125 Tons	#6 Guillotine	650 Tons

Both Attain New Popularity Due to Recent Kling Improvements!

Both Are Winning More and More "Production Oscars"

KLING FRICTION SAWS: There are two big reasons for today's renewed popularity of these high-speed saws. *First*—a growing recognition of the exclusive advantage of friction sawing . . . faster cutting of steel shapes (structurals and solids) without changing setup. *Second*—new KLING developments providing semi-automatic control for controlling the speed of the carriage, and other added advantages in line with today's automation trend. KLING Friction Saws also reduce the "cost per cut" to a new low, and one KLING Saw will take the place of several saws of other types, as users in "the best of companies" will verify. Ask for list of users in your industry; also, send for Bulletins 4200 and 9200 giving full details.

KLING GUILLOTINE SHEARS have been completely redesigned to assure users an even wider range of capacities and still sturdier construction for additional years of service. Some of the new features of the machine illustrated are . . .

Power Drive and Speed Reduction unit is a fully enclosed, welded steel housing containing precision cut, heat-treated steel gears.

The Shear Unit has a ductile iron frame of exceptionally high tensile strength. Other features are shock resistant, alloy tool steel blades, new type guarding, replaceable hardened steel wear strips, heat-treated alloy steel dual pintle blocks, T-slots in steel slide, modern lubrication system.

For data on all the various Kling Metal Fabricating Machines, write today for your copy of the New Complete Line Bulletin 100.

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1083

MACHINE TOOL HIGH SPOTS

Does Automation Need Big Volume?

Some small producers find automation pays even for limited volume production . . . Requires sharp figuring and planning . . . Storage and inflexibility are some problems—*By E. J. Egan, Jr.*

◆ THE SMALL LOT producer of metal goods has a tough problem in trying to decide whether automation will do him any good. Even the automation "naturals," the big automotive and appliance firms, demand a lot of hard-headed cost justification before they embrace the idea.

A few tips to help the short-run producer stay competitive were offered by various panel speakers at a recent SAE Aeronautic Production Forum held in New York.

Has the typical small lot, let's say a month's supply of a certain part, habitually been run off on so-called standard, hand operated machines? Apparently some firms have found that it pays to automate so that they can turn out a six-month's, or even a year's supply, in about the same time. The fundamental consideration here must always be the assurance of a stable market, and a minimum of design change.

Storage Problem . . . Granted that storage space is needed for the over-normal production. And storage space costs money. But it could be that this cost is still less than possible automation savings in such areas, as: (1) reduced labor costs; (2) reduced floor space; (3) better product, (4) enough flexibility in the automated line so that it can be tooled up for as many additional products as possible.

Many people deplore the inflexibility of automation. But it isn't, or at least it needn't be, so rigidly single-purpose that its basic functions can't be changed to some degree. Before any consideration of the idea is finally tossed out of the window, all parties concerned should be absolutely sure that the inflexibility problem just can't be solved.

There's a switch on this single-purpose automation design that might even be used to turn it to an advantage. One of the forum panelists suggested that the product design engineer is often the "forgotten man," when the process boys are putting the axe to automation proposals.

Look Ahead . . . He advised down-the-line consultation with product designers. His reasoning: Very often common parts could be worked out to fit a variety of types and sizes in the final models. Automakers have worked this out very well; the same radiator cap will fit on either the stripped down utility car or the deluxe three-tone hard top model.

Proper attention to this common-part could conceivably produce enough work volume to fully justify automated equipment.

If after exploring these possibilities the small lot producer still has to pass up full automation, a panel member suggested putting handling and feeding devices on tools.

Cuts Costs . . . It was observed that this could frequently be done at a cost that would soon be recovered by savings in manpower alone. Most workers were said to prefer being the "master" of possibly two or three machines of this type, rather than the "slave" of a single manual loading unit.

TAKING SHAPE: Boom of large truck crane handles machine tool exhibit at Chicago's International Amphitheatre, getting ready for fall show.

PREVIEW ITS SPEED, ACCURACY AND VERSATILITY AT THE SHOW!

CAST IRON END PLATES

30 pieces (60 surfaces) per hour; 1/8" stock removed each side; limits ± .002"

ADJUSTING SCREW WASHERS

Low carbon steel; 200 pieces (200 surfaces) per hour; .025" stock removed; limits ± .001"

HOT ROLLED STEEL CAMS

225 pieces (450 surfaces) per hour; 1/32" stock removed each side; limits ± .001"

NOW! BLANCHARD PRESENTS ANOTHER GREAT NEW GRINDER

with Automatic Cycle Control

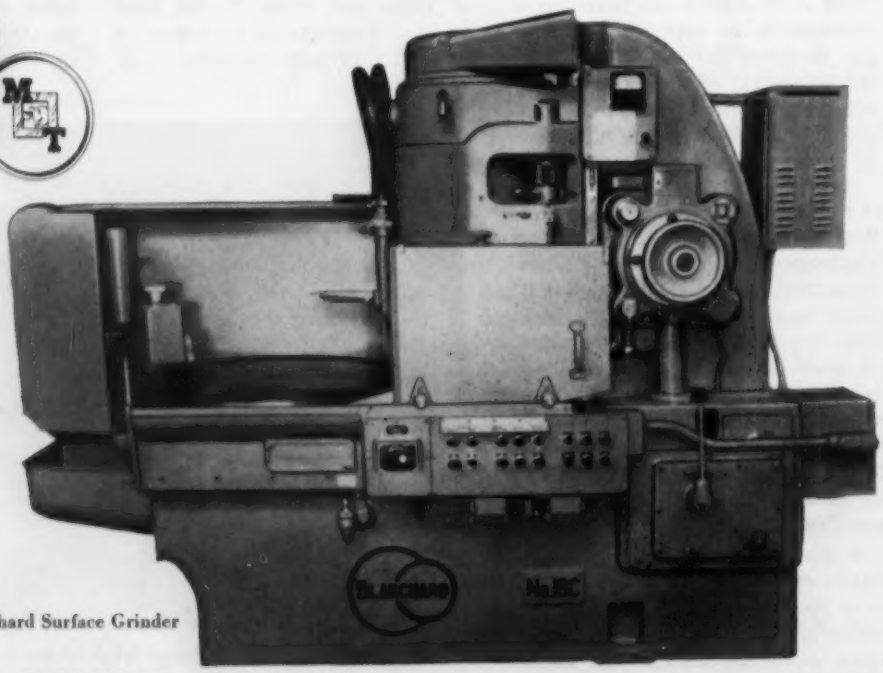
When you're at the show, watch this great new Blanchard Surface Grinder perform a variety of jobs with speed, ease and accuracy.

One operator can easily operate two of these No. 18-C grinders under balanced conditions. By using the automatic cycle, he can unload, clean and reload one grinder while the other is grinding.

Here's what the automatic cycle does: moves chuck (30" or 36" dia.) to grinding position and starts it rotating; starts wheel rotation and coolant pump; provides rapid wheel approach to work; engages power down-feed at preset rate; changes to fine feed just before finished size is reached; stops feed when work is to size – "sparks" out; raises wheel head; stops wheel, coolant pump and chuck; moves chuck to loading position – demagnetizes chuck.

This new Blanchard also features: push button selection of manual or cycle operation; size control; simplified feed and head traverse controls; adjustable dwell timer.

THE MACHINE TOOL SHOW
CHICAGO, ILL.
BOOTH 406



No. 18-C Blanchard Surface Grinder

THE BLANCHARD MACHINE COMPANY 64 STATE STREET, CAMBRIDGE 39, MASS., U. S. A.

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ROEBLING high carbon wire is unsurpassed for industry today. Roebling wire is absolutely true to specifications . . . absolutely uniform in gauge and finish. Manufacturers who try Roebling wire once, become Roebling customers from then on.

You *pay* for the best when you buy high carbon wire. Make sure that you *get* it! Always specify Roebling. John A. Roebling's Sons Corporation, Trenton 2, N. J.

The Jonker, world's largest emerald-cut diamond.

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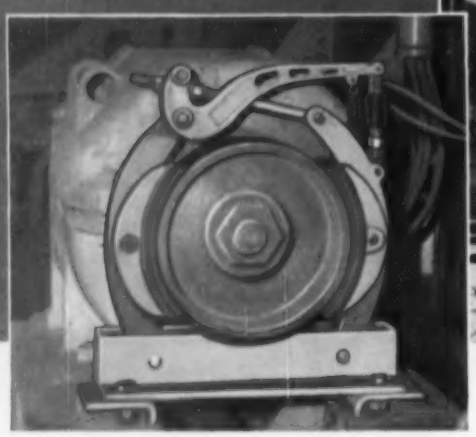
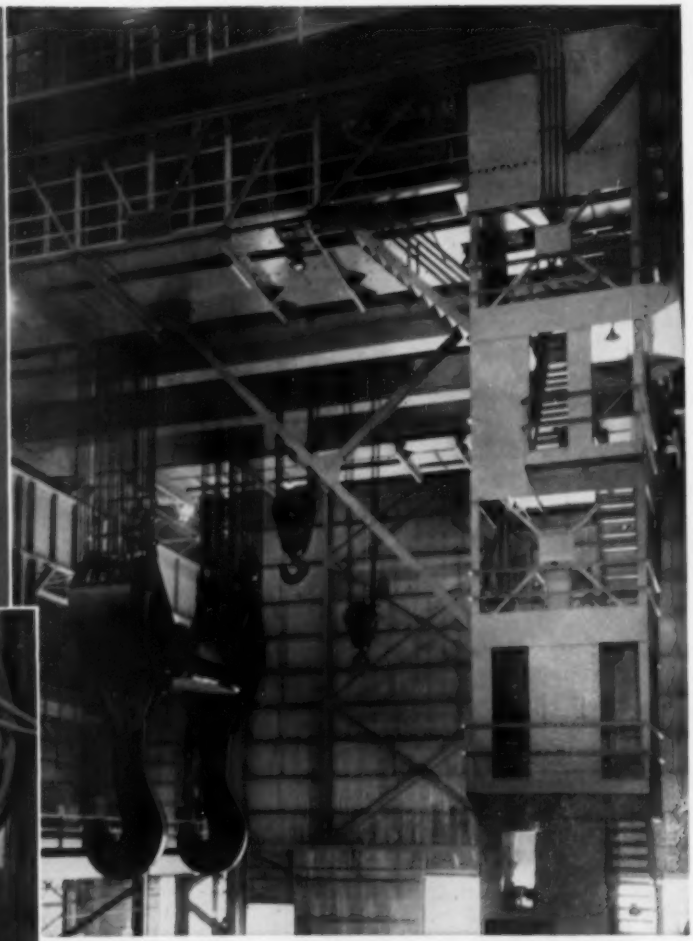
Wagner®
CRANE-BRIDGE BRAKES
...the choice of leaders in industry

World's largest ladle cranes equipped with Wagner Hydraulic Crane Bridge Brakes





Three 450 ton ladle cranes, at Fairless, are equipped with Wagner Type H Hydraulic Crane Bridge Brakes like the one shown at the left.

At U. S. Steel's Fairless Works, Wagner hydraulic crane bridge brakes enable operators to bring the world's largest ladle cranes—450 tons each—to safe smooth stops as easily as if they were braking an automobile.

Plenty of braking power is available at all times from two Wagner 18" x 8" type H brakes on each of the three cranes. Operators work both brakes simultaneously with a single control cylinder mounted in the crane cab. Operators do not tire before the end of a working day because the foot pressure necessary at any time is well within the capability of the average worker.

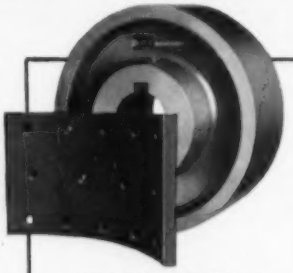
These exclusive Wagner features improve efficiency, lengthen lining life and reduce maintenance costs:

REMOTE CONTROL BLEEDER—Enables operator to bleed hydraulic lines from the cab.

SELF-CENTERING DEVICE—Centers shoes on wheel and prevents brake drag.

ONE-POINT ADJUSTMENT—Makes it easy to keep brakes properly adjusted.

If your cranes are not equipped with Wagner Brakes, we can show you how simple it is to install a modern hydraulic system. Four sizes, with or without parking attachment, cover the field and can handle any crane bridge braking application. Wagner also offers *Powered* Hydraulic Crane Braking for applications where exceptional ease of braking operation is desired. Bulletin IU-40 gives full information—write for your copy today.



Replacement Lining and Brake Wheels

Wagner offers the perfect combination of brake wheel and non-scoring lining for replacement needs. Specially designed for industrial uses, it is available in rolls, blocks, and discs.

Wagner Electric Corporation EST. WE 1891

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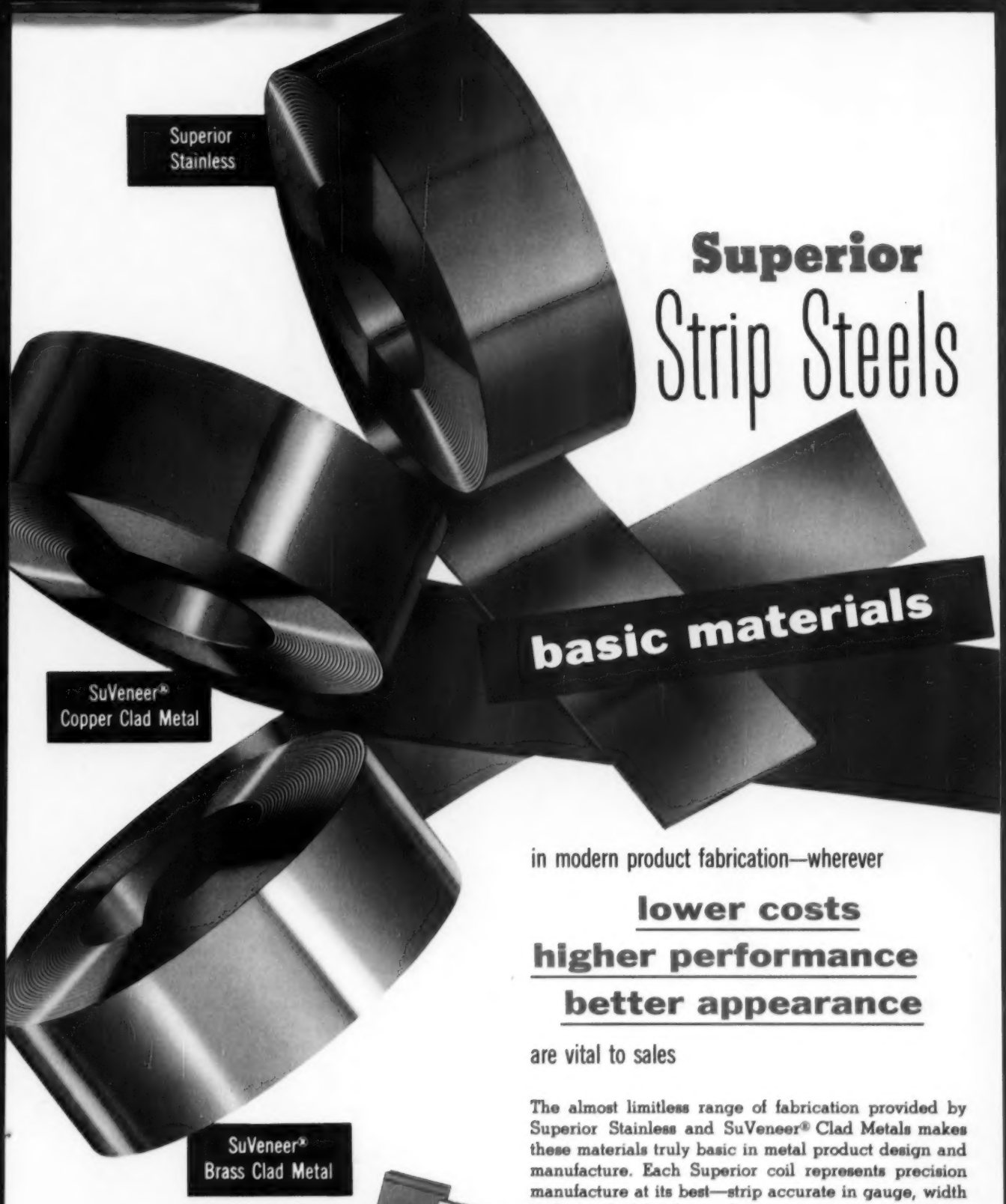
155-2



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basic materials

in modern product fabrication—wherever

lower costs
higher performance
better appearance

are vital to sales

The almost limitless range of fabrication provided by Superior Stainless and SuVeneer® Clad Metals makes these materials truly basic in metal product design and manufacture. Each Superior coil represents precision manufacture at its best—strip accurate in gauge, width and specified finish—uniform in composition—exact in temper for your particular need. *Check with us!*

"QUICK FACTS on Superior Strip Steels" . . . and "An Introduction to Clad Metals" . . . two useful, free publications you should have. Write for them today!

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The Iron Age SALUTES

Leo M. Harvey

A career ranging from one-man machine shop operation to heading a 2500-man metalworking organization has left his early devotion to the American way stronger than ever.

Leo Harvey heads a 2500-man metalworking organization in Torrance, Calif. His company turns out aluminum extrusions and screw machine products; has figured prominently in the Air Force heavy press program; has earned Army and Navy commendations.

Mr. Harvey is a highly successful man and two interesting stories go with his success. Founder of Harvey Machine Co., Inc. and Harvey Aluminum, he started out in 1913 with a one-man machine shop in Los Angeles. For equipment he had a lathe and a drill press.

Before too long, his work with machines, tools and metals attracted the interest and business of local manufacturers. The Harvey company began growing. By the 30's, the firm was functioning as a medium-size job shop, doing set screw machine work.

When World War II hit, Harvey became a large prime subcontractor, gaining nods of approval from the services for war production. Experience working with aluminum was also gained and led to the formation of Harvey Aluminum. Today Harvey is active in both the extrusion and forging press phases of the Air Force program.

Big asset of the Harvey company in its growth has been the inventiveness of its founder. A natural born machine man, Mr. Harvey has redesigned and adapted equipment; knows when an old model can be modified for a job, when a new unit is needed.

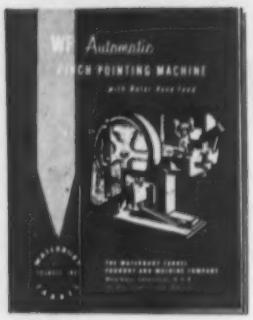
The other part of Leo Harvey's story centers on his personal reaction to a rugged upward climb. He was born in Europe, came to this country over 40 years ago on the strength of an image of freedom and opportunity. He ran his own business through crashing 20's and the grim 30's. He came through successfully and he came through with his ideals intact. He is today an articulate, sincere booster of America; has been cited in the press as an example of what makes the country tick.

Mr. Harvey is a shirtsleeve engineer who is an authority on jade. He likes to travel, has built up a fine array of china and art.

☐ "Waterbury" Automatic Nut Formers

Cir. No. 930-A-2

Describes operation and illustrates design details of machine which can cold forge a wide variety of standard and special nut blanks as well as similar parts. Production rates range from 60 to 125 per minute depending upon size of machine. Gives specifications for 5 sizes ranging from ¼" to ¾" nominal bolt capacity. 8 pages.



☐ Automatic Pinch Pointing Machine

Cir. No. 742-A-2

Describes and illustrates rotor vane feed pinch pointer with maximum production capacity of 150 per minute. Max. blank diameter ½". Max. length under head 2½". Min. length under head ¼". Shows typical work samples and gives table of specifications.

☐ High Speed Screw Slotter

Bul. No. 106-A-3

Describes and illustrates WF's revolutionary new slotter—production team-mate of the new threader. Uses single feed mechanism and single saw to slot up to 2,000 burr-free blanks per minute.

☐ High Speed Threader

Cir. No. 942-A

Describes and illustrates completely new type of thread rolling machine which uses planetary dies to thread up to 2,000 blanks per minute.

ARE YOU UP-TO-DATE ON WF BOLT, NUT & SCREW MACHINERY?

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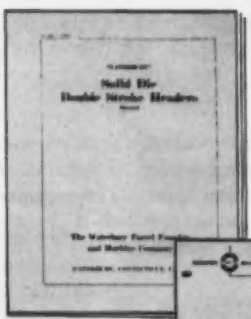
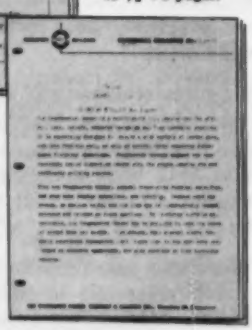


☐ "Waterbury" Solid Die, Double Stroke Headers

Cir. No. 933-A-2

Explains construction and operating features of crank type, two blow headers for producing the standard varieties of bolt and screw blanks as well as many special cold-forged products. Gives specifications for five sizes of long stroke and five sizes of short stroke machines handling wire diameters from 3/16" to ½". 8 pages.



☐ "Waterbury" Progressive Headers

Bul. No. 104-A-2

Covers features of multiple die cold heading machine which has roll feed, cut-off, transfer mechanism and four operating stations. Points out that machine can produce wide variety of headed work including hexagon head cap screw blanks and socket head cap screw blanks. Four sizes of headers are covered in the specification tables. 8 pages.

Write for circulars by number or check the ones you want and simply mail this page with your name and address to —

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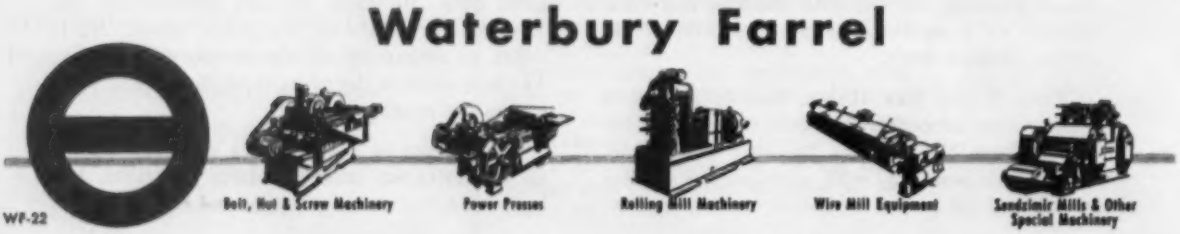

WF-22

The Iron Age INTRODUCES

F. J. Geiger, appointed general manager, Norwood, Ohio, Works, **Allis-Chalmers Mfg. Co. Raleigh H. Barnes** and **Donald T. Fowler,** assigned as sales representatives of Cleveland and Evansville offices. **John J. Dwyer,** named field service representative in the mid-Atlantic region. **Walter B. Lawrence,** named sales district manager, with headquarters in Columbus, Ohio.

Charles H. Weaver, named vice-president, **Westinghouse Electric Corp. John W. Simpson,** appointed manager of the atomic reactor development activities in Pittsburgh. **D. R. Tashjian,** appointed manager of engineer, Electronics Div., Baltimore. **V. B. Baker,** appointed to the newly created position of assistant engineering manager, executive department, East Pittsburgh Div. **Wayne D. Baker,** appointed assistant manager, southeastern region, Lamp Div. **John F. Kelleher,** named regional operations manager, eastern and New England regions, Lamp Div.

Gordon O. Jones, appointed credit manager, Los Angeles warehouse, U. S. Steel Supply Div., **U. S. Steel Corp. Hugh A. Plane,** appointed regional credit manager, Chicago, Supply Div.

Harold C. Cook, appointed purchasing agent, Dodge Div., **Chrysler Corp. Burton R. Durkee,** appointed assistant sales manager, advertising and merchandising, Chrysler Div. **J. C. Poyner,** named assistant general purchasing agent-raw materials.

Gifford V. Leece, elected chairman of the executive committee, **Gardner-Denver Co.,** Quincy, Ill.

Henry C. Ashley, promoted to assistant director of metallurgy, **Chase Metal Works,** Waterbury, Conn.

Robert H. Wilkie, named merchandising manager, sales department, New Departure Div., **General Motors Corp.**

Edwin L. McCarty, appointed manager, Kansas City territory, **Morse Chain Co.,** Ithaca, N. Y. **Chester J. Spacher,** named sales manager, Chain Drive Dept.

Edward T. Fitch, elected director, **Dravo Corp.,** Pittsburgh.

C. R. Mitchell, Jr., appointed manager-stainless steel sheet sales, **Allegheny Ludlum Steel Corp.**

P. H. Reynolds, appointed staff engineer-rolling mills, **Jones & Laughlin Steel Corp.,** Pittsburgh.

Charles C. McGarry, appointed assistant superintendent - mason and labor dept., Warren district, **Republic Steel Corp.**

Max Riebenack, III, elected president, **Industrial Brownhoist Corp. Stanley R. See,** promoted to vice-president and assistant to the president.

John C. Mueller, appointed financial analyst, **Crucible Steel Co. of America.**

HARRY F. VICKERS, elected vice-chairman of the board, Vickers Inc., Detroit.

KENNETH R. HERMAN, elected president, Vickers Inc., Detroit.

DR. WALTER C. RUECKEL, elected vice-president and general manager, Engineering and Construction Div., Koppers Co., Inc.

THOMAS S. WHITEWAY, named president and treasurer, Whiteway Stamping Co., Cleveland.

LIFE STEPS UP AT 40!

1915 - 1955
FORTY DE-STA-CO QUALITY STAMPINGS YEARS

Sure we've been making stampings for 40 years! . . . But we're going up the hill faster than ever!

Expanded facilities! . . . Newer equipment! . . . Wider diversification! . . . Even more customers—and from every major industry!

The mere fact that we're the nation's best-known job stamping manufacturer . . . shows how we've progressed.

Now . . . as our life steps up at 40 . . . would be a good time to let us do a bang-up job for you, too!

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545 Midland Ave., Detroit 3, Mich.
America's Best-Known Job Stamping Manufacturer

George A. Waterman, appointed extrusion manager, **Kaiser Aluminum & Chemical Sales, Inc. David E. Welsh,** promoted to district service manager, Philadelphia district office. **James S. Goodman,** named manager of the Evansville, Ind., branch sales office, **Robert F. Watson,** appointed assistant manager of the Cincinnati district office.

Howard W. Bennett, appointed consultant-marketing, Gear-Motor Planning Study, **General Electric Co. James H. McDuffie,** appointed manager of employee and plant community relations, Outdoor Lighting Dept. **Bertram W. Mahoney,** appointed general manager, **Industry Control Dept. Charles P. Page,** named manufacturing engineering specialist, Distribution Assemblies Dept.

Robert F. Kendall, appointed general purchasing agent, **Reliance Electric and Engineering Co.,** Cleveland.

Dana M. Norton, appointed director of industrial relations, Detroit area operations, **Studebaker-Packard Corp. Peter S. Barno,** named director of industrial relations for the plants in South Bend.

Richard W. Coyle, appointed director of industrial relations, **Midvale Co.,** Philadelphia. **Wilfred F. Dittgen,** appointed plant manager.

R. S. McLaren and **G. V. Emerson,** appointed assistant controllers, **Dravo Corp.,** Pittsburgh. **H. R. Mantle** was named auditor and **E. M. Gibson** was promoted to office manager.

David M. Edwards, appointed to head industrial management studies, **Battelle Institute,** Columbus, Ohio.

James H. Gertz, appointed western New York State area salesman, **Osborn Mfg. Co. Lane Jonap** will work in the Minneapolis, Iowa and Nebraska territory, and **Howard A. Simons** will move to the Cleveland territory.

DR. CARL B. POST, promoted to vice president in charge of metallurgy, Carpenter Steel Co.

H. STRUVE HENSEL, elected chairman of the board, Ulen Management Co.

DONALD H. SPICER, named vice-president in charge of sales, Morse Chain Co.

JAMES W. REED, appointed Pacific Coast manager—Los Angeles, San Francisco and Seattle, Cooper-Bessemer Corp.

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unlocks your inventory · safeguards your production

You need not tie up capital and plant space with stocks of steel . . . not when there is a J&L Steel Warehouse near at hand from which you can withdraw steels to meet your requirements. And you can eliminate still more cost and boost your production rate by using J&L's Fabrication Service for shearing, forming, torch cutting, blanking, etc.

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STEEL CORPORATION — *Pittsburgh*

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Look Overhead . . . see "NORTHERN"

For heavy, continuous service in steel storage yards

The 40-ton, 75-foot span, heavy duty crane shown above is typical of many similar NORTHERN CRANE installations in steel mills, fabricating plants, and similar plants in heavy industry.

NORTHERN mill type cranes are designed and built to meet the most exacting requirements, providing for continuous service, maximum loads, and high impact allowances. Mill type motors and control equipment provide highest electrical performance.

NORTHERN CRANES are the result of over 55 years' experience in the design of overhead electric traveling cranes, heavy duty electric hoists and other materials handling equipment.

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NORTHERN ENGINEERING WORKS
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PERSONNEL

Raymond I. Bond, appointed purchasing agent, **Veeder-Root, Inc.,** Hartford.

Thomas H. Trimble, appointed manager of public relations, **Hooker Electrochemical Co.,** Niagara Falls, N. Y.

Harry L. Anderson appointed superintendent, masonry department, Youngstown district steel plant, **Republic Steel Corp.**

Harry L. Smith, Jr., elected sales vice-president, **Aluminum Co. of America,** New York.

Louis F. Chol, named district manager, Newark, N. J., warehouse and office, **Chase Brass & Copper Co., Inc.,** a subsidiary of Kennecott Copper Corp.

Ray Howland, Jr., elected vice-president in charge of operations, handling production and labor relations, **Eastern Tool & Stamping Co., Inc.,** Saugus, Mass.

John B. Jacobsen, appointed as replacement production salesman in southeastern New York, **Johnson Bronze Co.**

Robert J. Koch, appointed field sales manager, **Morse Chain Co.,** Ithaca, N. Y.

Clayton G. Findlay, appointed district manager in St. Louis, **Electric Controller & Mfg. Co.**

OBITUARIES

C. Howard Paul, 61, assistant treasurer, **E. W. Bliss Co.,** Canton, Ohio.

D. Angus Currie, 68, chairman & treasurer, **Erie Foundry Co.,** Erie, Pa.

Fuller Barnes, chairman of the board of **Associated Spring Corp.,** Bristol, Conn.

Wallace H. Smila, 63, retired mechanical engineer, **Chrysler Corp.,** Detroit.

NAVAL SHIPYARDS STEP UP PRODUCTION WITH...

BLISS 1000-TON KEEL BENDERS

Rocking action illustrated: slide comes down on work and then rocks back and forth to bend it into desired shape. Key to this smooth rocking action is the fact that weeks were spent in hand-finishing the mirror-like seats at the ends.

At Boston Naval Shipyard, this 1000-ton Bliss keel bender shapes hull, bulkhead and keel plates up to 22 feet long and 10 feet wide—faster, easier and at less cost than previous installations. And here's why...

This press operates like a press brake, but has a unique and different slide (ram) action—it can be moved up or down on an angle and rocked back and forth. With this "skewing" action and properly designed dies, this hydraulic press can form the many different hull and keel plates needed.

The "skewing" action is achieved this way: the pressing beam, while rigidly secured in the slide housings, is flexibly mounted in the crossheads on mirror-like ball seats. This permits the full action desired and gives the press its versatility. The result is a wide choice of pressing combinations and greatly increased production.

In fact, the Navy reports it's "a decided improvement" over older units. Recently, a twin bender was installed at the Charleston (S. C.) Naval Shipyard.

These keel benders, though unique, are actually only recent examples in our history of tackling the difficult in press building. If you are faced with an unusual press engineering problem, why not let a Bliss representative give you the benefit of our collective experience.

E. W. BLISS COMPANY, Canton, Ohio
PRESSES, ROLLING MILLS, SPECIAL MACHINERY

BLISS
SINCE 1857

is more than a name... it's a guarantee

U. S. Plants in Canton, Cleveland, Salem and Toledo, Ohio; Detroit and Hastings, Mich.; San Jose, Calif.; Pittsburgh and Midland, Penna. Branch Offices in Burbank, Chicago, Cleveland, Dayton, Detroit, Indianapolis, New Haven, New York, Philadelphia, Pittsburgh, Rochester, Salem, San Jose, Toledo, Washington, D. C.; and Toronto, Canada. Other representatives throughout the world.
E. W. Bliss (England) Ltd., Derby — E. W. Bliss Co. (Paris), France

Seven years service for STANOIL *Industrial Oil at David Bradley Mfg. Works —No down time for lubrication*

L. R. Cummings (left), Standard lubrication specialist, inspects sample of STANOIL, with Robert C. Menken, Plant Engineer of David Bradley Manufacturing Works. Larry Cummings has been serving industrial customers for Standard Oil since graduation from Standard's Sales Engineering School. His mechanical engineering degree from Tri-State College of Indiana qualified him for this work. Customers of Larry's find this experience and background pay off for them.

David Bradley Tri-Trac, handy piece of farm equipment, gives farmer new opportunity for mechanization at low cost. Upper frame on which gasoline tank is mounted, is part formed in HPM press.

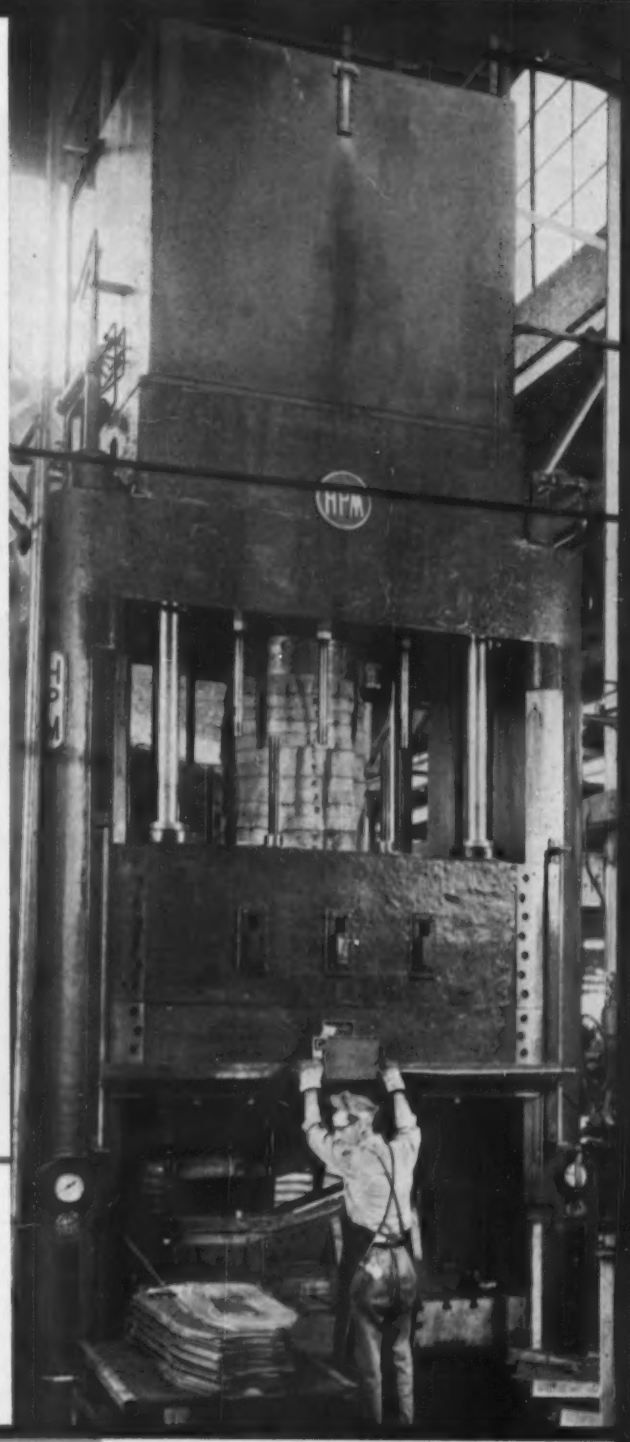
Seven years ago, David Bradley Mfg. Works installed 900 gallons of STANOIL Industrial Oil in an HPM press. There's been no down time required for lubrication maintenance since. A pump by-pass screen filter is the only filtering the oil receives, yet the system continues clean. In March, 1954, an analysis of the oil showed:

Viscosity @ 100°F.—980
Color, NPA — 6
Neutralization No.— .11

STANOIL Industrial Oil has long been at work for Bradley. Successful operations with it in other equipment caused Bradley engineers to specify STANOIL for this installation.

The HPM double acting, fast traverse hydraulic press reported on here is used to draw the upper frames for the David Bradley Tri-Trac, compact farm tractor. The Tri-Trac is the newest implement in the Bradley line. Bradley has been making farm implements since 1832.

Like to know more about STANOIL? Perhaps it can serve you as efficiently as it is serving David Bradley. Lubrication specialists in any Standard Oil office will be happy to help. In the midwest, a call to one of them will bring a prompt response. Or contact: Standard Oil Company, 910 South Michigan Avenue, Chicago 80, Illinois.



HPM 500-ton press on the upstroke after drawing upper frame for David Bradley Tri-Trac. Hydraulic system remains clean after 7 years service using STANOIL.

STANDARD

STANDARD OIL COMPANY
(Indiana)

More shaft mileage!

SEALS LONGER, SAVES EXPENSIVE ROLL-NECK RE-GRINDING

Right this minute this seal is saving money in steel mills. Installed on hot mill rolls, C/R's new Type HMS Oil Seals exclude water and foreign matter from expensive bearings, prevent oil leakage and seal dependably with longer service life than ever before. Most important, the Sirvene (synthetic rubber) sealing elements are especially designed and compounded to reduce shaft wear. Tests by users confirm the success of this design. They report little or no shaft scoring with the new Type HMS seals. This means less downtime to re-metalize and re-grind roll necks . . . big savings in maintenance costs.

Your costs can be lowered, too, with the right C/R Oil Seal. Chicago Rawhide's unmatched engineering experience and production facilities are at your service. Please write or phone about your sealing problem. Offices in principal cities.

C/R

PERFECT *Oil Seals*

More automobiles, farm and industrial machines rely on C/R Oil Seals than on any similar sealing device

CHICAGO RAWHIDE MANUFACTURING COMPANY

1301 Elston Avenue OIL SEAL DIVISION Chicago 22, Illinois

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EXPORT SALES: GEON INTERNATIONAL CORP., GREAT NECK, NEW YORK

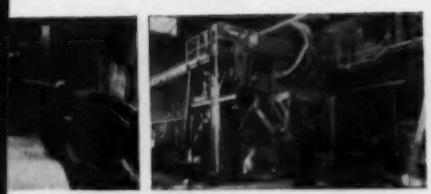
Other C/R products

SIRVENE: (Synthetic rubber) diaphragms, boots, gaskets and similar parts for critical operating conditions • CONPOR: Controlled porosity mechanical leather packings and other sealing products • SIRVIS: Mechanical leather boots, gaskets, packings and related products.

The Iron Age
FOUNDED 1855
TECHNICAL ARTICLES

For the fabricator

Steel Strip Cut Up Line Solves Handling Problems



◆ Hot-rolled steel strip can be cleaned, oiled, and cut to size more efficiently and in less time in this unusual strip cut up line . . . The new installation provides better material realization and greatly reduces direct labor.

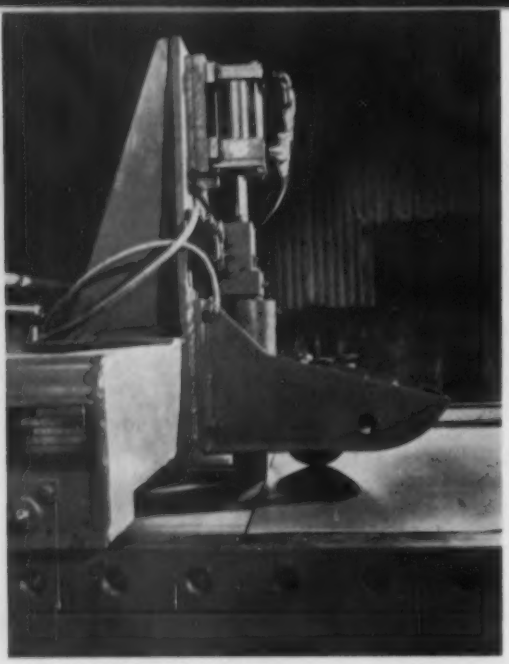
◆ A shot blast cleaner replaces all pickling . . . Strip can be cut angularly to reduce scrap . . . Handling operations are pared to minimum by novel methods.

By P. M. **UNTERWEISER**, Metallurgical Editor

◆ SPEED, ingenuity and engineering skill have combined with automation to produce a steel strip handling and "cut up" line that is one of the nation's most efficient. Designed to handle sheet and plate as well as strip, the line was recently put into operation at Parish Pressed Steel Div. of Dana Corp., Reading, Pa. The company is a major producer of automotive frames, heat treated truck frame parts and a variety of other stampings and assemblies for farm implements, electrical appliance and machinery.

Along with other automotive subcontractors, Parish is faced with an increasingly competitive market. All are pressed by the rising cost of material and labor. In the resulting economic squeeze, efficiency becomes synonomous with survival.

The new cut up line permits the use of hot-rolled steel strip. As the strip is fed through the line it is cleaned of scale, cut to size (at a desired angle), phosphate lubricated and stacked.



DEVICE ON GAGING table is used to control sheet length to be cut. Stop is to left of wheel.

Although the floor space the line occupies is relatively small (200 ft long by 30 ft wide), it can handle 23,000 lb coils at a rate of about 50 tons per hour. Maximum line travel speed is about 150 fpm. In a normal month the line will process close to 40 million pounds of steel.

All of the mechanical handling operations designed into the cut up line provide maximum flexibility. Parish had been using sheet and plate exclusively, prior to the recent installation. Thousands of tons of these materials must be used up before the line can be devoted solely to strip.

Feeder has cantilever design

For this reason and also because there may be times in the future when strip is hard to get, the line starts with an entry pack conveyor and sheet feeder.

The sheet feeder has a cantilever design which allows manual feeding of plate up to 40 ft in length by 4 ft wide. Automatic feeding of sheet and plate is provided to handle sizes up to 20 ft long and 5 ft wide. The conveyor can store two packs of sheet or plate while one is being processed.

Coiled strip is fed into the line by a "payoff reel" or uncoiler. This ingenious device, designed and built by the Wean Equipment Corp., Cleveland, picks up the leading edge of the coil and guides it into an entry flattener.

A major difficulty with all uncoilers is the tendency of the strip to shift from side to side. The shifting results in improper feeding and can, if pronounced, jam the line. Wean engineers licked this problem by installing an Askania edge control unit which automatically keeps the strip centered.

Coiled steel strip is wound tight at the mill. As a result, ripples develop in the strip surface when the inner laps of the coil are unwound. Thus a flattener of some sort is needed to re-straighten these portions of the strip.

Wean designed a special entry flattener consisting of 3 top and 2 bottom rolls. The flattener provides a reverse bending action to straighten any "coil breaks" which might be encountered during feeding.

From the entry flattener the strip is conveyed to a Pangborn Rotoblast cleaning cabinet. The unit removes mill scale by blasting both sides of the strip with steel shot. It is one of the first of its kind ever built.

The principal advantage of the blast unit is that it eliminates all pickling tanks and the problems associated with pickling operations. S-170 steel shot is gravity fed from a central hopper to centrifugal paddle wheels. The wheels propel the shot with great force against the strip's surfaces.

Blast clean both sides

Wheels are arranged above and below the strip so that both sides are cleaned simultaneously. This arrangement, in addition to being most efficient, also eliminates strip distortion. Blasting on one side only would induce compressive stresses which would buckle the strip in the direction of the blast, simulating an Almen strip effect.

Scale-free strip is moved along to a 72 in. upcut shear. Cutting strip up to 3/16 in. gage is the machine's prime job. For maximum versatility, it was also designed to cut plate up to 3/8 in. thick.

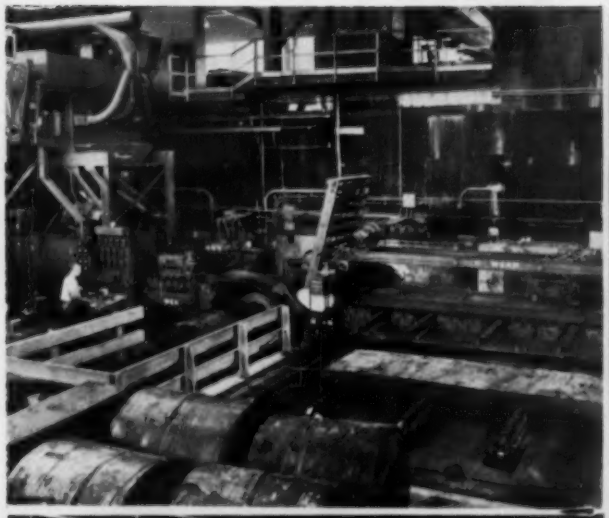
Better material realization is gained because the shear can cut straight or at an angle. Cutting at the particular angle which comes closest to the shape of the part reduces scrap. In the mass production of automotive frames, angular cutting results in the saving of tons of steel.

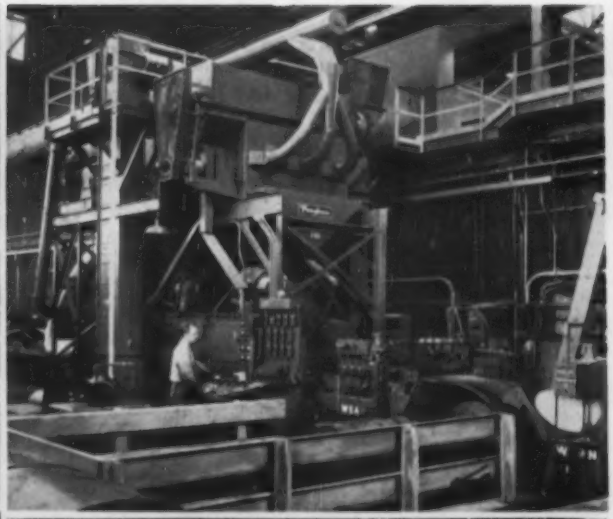
A gaging table and reject conveyor follow next in the cut up line. The table is equipped with a special device to shear 12 in. from the leading edge of each coil. This crop end material is used for making small parts.

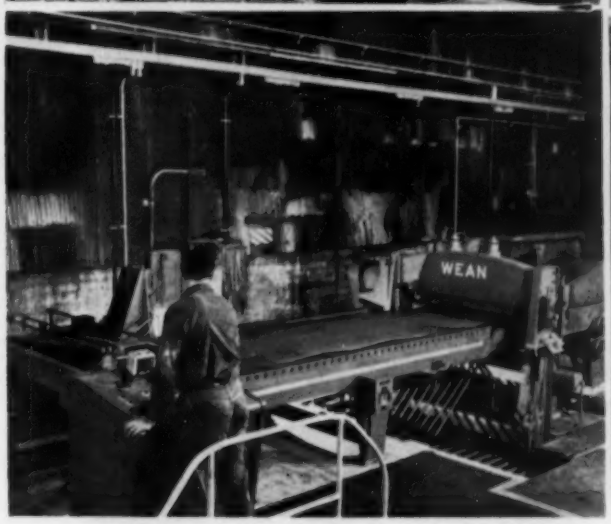
The reject conveyor provides for rejection of bad material as well as the trailing crop end, conveying this below the line into a large crop end container.

The strip is no longer flat after this series of operations. In order to be flattened and straightened for press forming, roller levelling is required. Wean has provided a 17-roll leveller for this purpose. The machine consists of a series of double-backed-up rolls, which, by means of reverse bending action, produce a straight strip.

The leveller also serves to pre-stress the strip







Top—Left: **LOADING END** of steel handling and cut up line showing, from right to left, entry pack conveyor, sheet feeder, uncoiler, and entry flattener.

Top—Right: **BLAST MACHINE** rapidly descales variable width material using S-170 round steel shot.

Bottom—Left: **THE UPCUT SHEAR** has a 72 in. blade which can make a straight or angular cut as required.

Bottom—Right: **OILER, DRYER** and recoiler viewed from right to left. Oiler washes strip at high pressure.

"A novel shot blast cleaner completely removes all scale from steel sheet and plate . . . Eliminates all pickling tanks along with their mess, fumes and hazards . . ."

to a degree that tends to improve its formability. The effectiveness of pre-stressing is limited by time to some extent. If the strip is allowed to age, the benefits of pre-stressing are gradually lost.

There are times when Parish recoils strip for either storage or shipment to another of the company's divisions. This involves descaling, phosphate lubricating, and recoiling. The roller leveller is then used to provide controlled tension when the strip is recoiled.

The "oiler" or phosphate lubricating machine handles the next processing operation after roller levelling. Here the straightened strip is washed with a large volume of lubricant sprayed from nozzles at pressures of 60-80 psi. Rubber wringer rolls remove excess lubricant from the strip.

New lubricant used

The lubricant itself is a unique feature of the processing line. Developed by Reilly, Whitmas and Walton of Conshohocken, Pa., its basic ingredients are phosphates and animal fats. It is heated to about 180°F and maintained at that temperature in order to provide proper viscosity.

Impingement of the lubricant against both sides of the strip results in a mechanical cleaning action. Pressures are sufficient to remove loose scale and some of the minute steel particles picked up at the blast cleaner. A continuous magnetic filtering system removes oxides and metallic contaminants so that the recirculated lubricant is clean enough for reuse.

Recoiling controlled

Ingredients of the lubricant serve three important functions. The oils and phosphates help prevent rust. The combination also provides a uniform surface coverage which eliminates the need for further lubrication at the forming presses.

Performance of the lubricant in terms of die wear seems to be ideal. It adds just enough lubricity to reduce friction without affecting proper forming. Since the finished frames are sprayed with a black paint before shipment, the phosphates also promote good paint adhesion.

The cleaned and lubricated strip is now ready for recoiling—or stacking, if it has been cut to sheet lengths. An expanding coiling reel with an Askanian edge control unit is used for recoiling. The control unit will automatically shift the recoiler as required to maintain straight edges on the rewound coil.

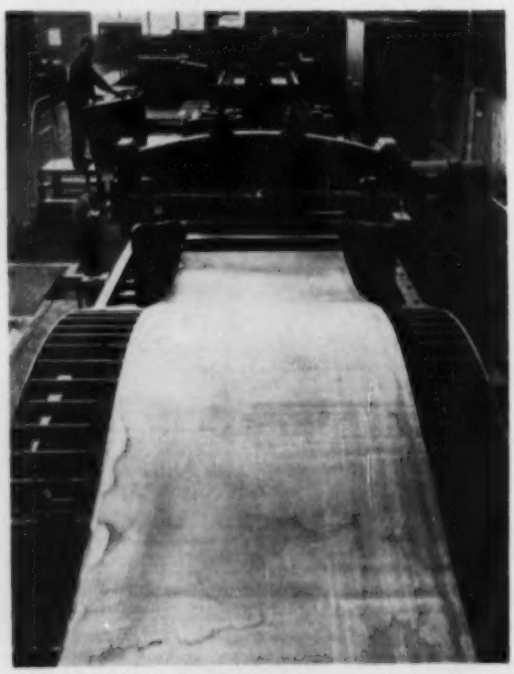
A stacker and transfer conveyor take care of the final handling of all strip cut to sheet lengths. The stacker is provided with holding rails which receive the sheet on a line parallel with the surface of the feeding conveyor. The levers are automatically tripped, dropping one sheet on top of another. By this means the lubricating film is maintained. Sheets are mechanically counted during the stacking operation.

Stacks are sorted

When a pack of sheets is stacked, it is transferred to either the east or west receiving bay. East bay material is intended for use in this division. Sheets that are transferred to other divisions of the company are moved to the west bay.

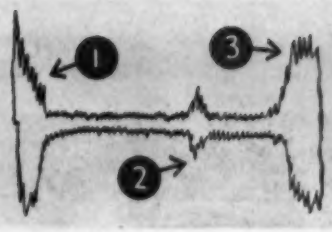
At the present time the stacks are steel-strapped by hand. This is an operation which readily lends itself to mechanization and is on the agenda for the future.

The cut up and handling line is doing a highly efficient job. But, it is this degree of efficiency that keeps opening new doors for future development. Perhaps the next logical step will be feeding the coiled strip to the forming presses automatically. Or perhaps a revamp of heat treating facilities will come first.



HUMP TABLE conveys both sheet and strip to the large upcut shear seen directly ahead.

Ultrasonic Test Detects Enlarged Grains In Some Steel Parts



Components of Reflectogram Pattern

1. Initial pulse—The point where the sound wave enters the piece being tested.
2. Sonic indication—Indication due to a discontinuity in the piece.
3. Back reflection—Indication from the reflecting face opposite the test face.

◆ Nondestructive ultrasonic testing can detect grossly coarsened grain structure in some finish machined steel parts, a recent study has shown . . . Such coarsening, often a result of overheating in heat treatment, can be a factor in service failure.

◆ Overheated samples of 1045 steel show a pronounced sonic effect, particularly at highest and lowest frequencies . . . Materials tested in this long range study program included both lean and high alloy grades.

By R. N. HAFEMEISTER, Foreman, Nondestructive Testing, Allis-Chalmers Mfg. Co., Milwaukee

◆ SERIOUS GRAIN COARSENING in finish machined steel parts can be detected by a nondestructive test method. Using a standard ultrasonic tester the new method provides a means for segregating finished parts, in some steel grades, which have been severely overheated during heat treatment. Segregation is highly important since the coarse grained material has inferior properties and may fail in service.

The use of ultrasonic test equipment to determine grain size in a number of commercial steels has been studied by the Allis-Chalmers Mfg. Co. An earlier article* showed how grain size could be determined in brass, using similar methods, without destroying the parts tested. The results attained through application of these techniques to steels fill an important gap in our knowledge of nondestructive testing.

Steels tested were 1045, 4140, Type 410 stainless, and A289, a high alloy, austenitic grade. Materials were selected to cover a range of both lean and high alloy, including grades normally martensitic, ferritic-martensitic, and austenitic. Grain sizes considered were within the limits of ASTM Nos. 1 to 8. This range represents grain sizes obtained by normal commercial heat treating practices.

Tests were made for the various alloys using 7 in. lengths of 2 in. diam hot-rolled bar stock.

*N. Grossman: "New Methods Determine Grain Size Ultrasonically," The Iron Age, Dec. 31, 1953.

The 7 in. lengths were heat treated and subjected to grain size determination by microscopical methods. After this, the bar ends were cut and polished to approximately a 125 microinch finish.

Test bars were 6 in. long after the ends were cut and polished. The highly polished ends were tested at three frequencies, 1.0, 2.25, and 5.0 megacycles. These methods were meant to correlate grain size and sonic indications within each alloy and also differences between the various alloys at the three test frequencies.

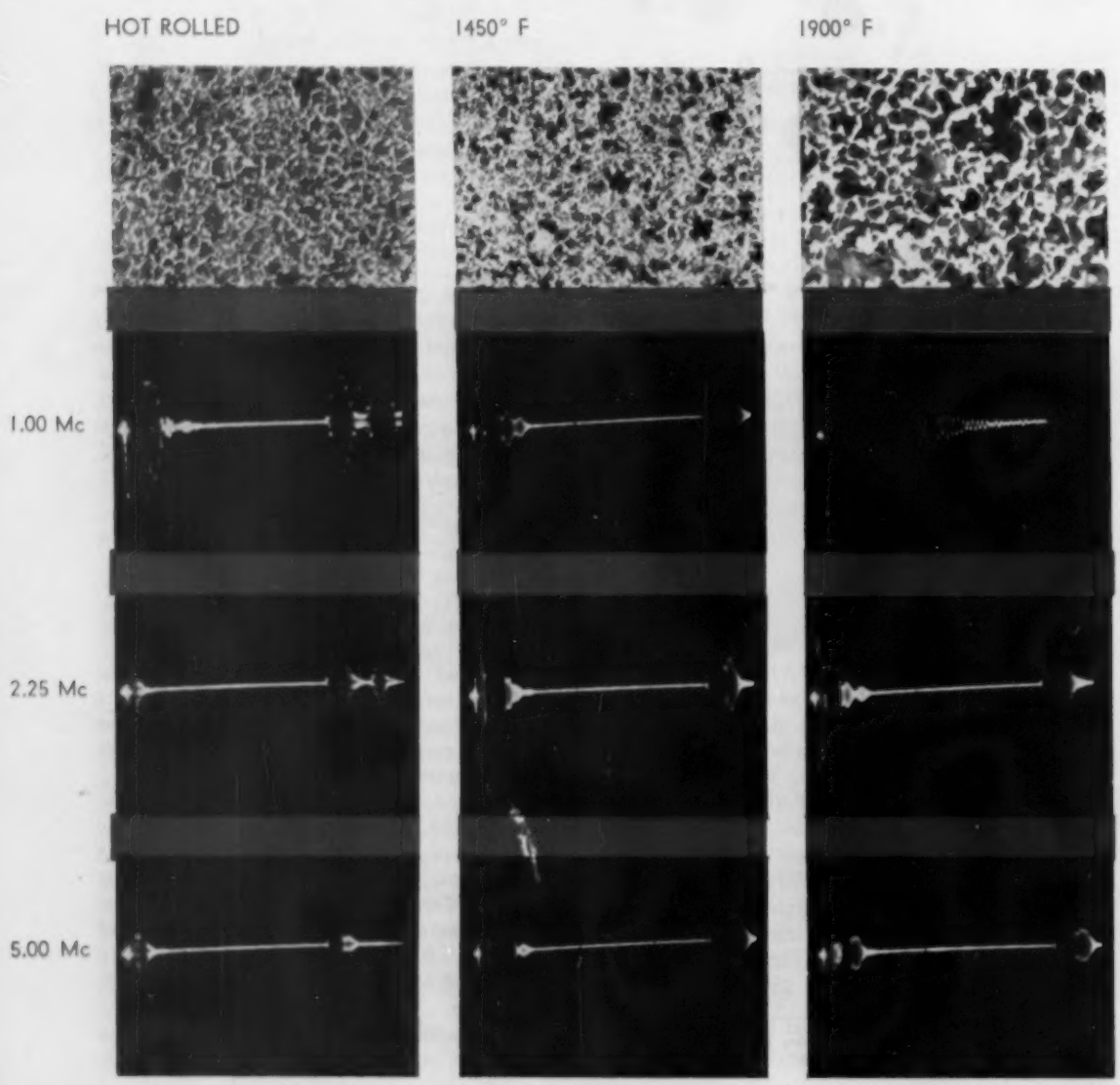
The test instrument used was a Sperry Ultrasonic Reflectoscope, type UR, designed for single crystal operation. Both ½ in. and 1 in. round and square crystals were used in probing with the aid of SAE No. 30 oil lubricant.

The 1045 steel in the hot-rolled condition was adopted as a standard. Total amplitude of back reflection of 2.5 in. was the base used for all frequencies. All deviations were taken from this limit. When the necessary settings on the instrument were established, all readings on the various samples were made without varying these settings. General results of the tests are shown in the table.

Two opposing opinions have been held regarding the effect of grain size on ultrasonic measurements. Some felt that change of grain size should show up as either a loss of back reflection or as finite sonic indications such as result from other non-homogeneites.

Others believed grain size should have no ultrasonic effect within the normal limits of heat treating. Any indications which might appear

Below: **EFFECTS of grain size and varying frequencies on test pattern. Photomicrographs (100X), left to right, correspond to the A, B, E and F specimens of 1045 described in the table on page 97.**



could probably be traced to slag inclusions, flakes, minute ruptures, or other similar imperfections in the steel. Such imperfections have resulted in loss of back reflection. In general the present tests tend to support this viewpoint within the limits noted.

Results obtained with 1045 steel subjected to various heat treatments, see table, are shown at the three different frequency levels. Reflectograms obtained for various grain sizes are shown on page 96. The overheated specimens show a pronounced sonic effect, particularly at highest and lowest frequency.

The 4140 samples show no sonic effect although they were subjected to the same heat treatments and contained similar grain size variations.

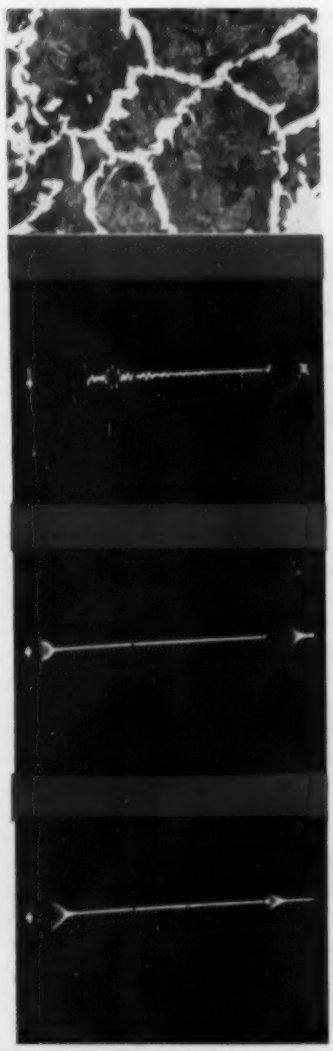
Studies were also made for both the 410 and A289 materials. The 410 steel, like 4140, shows no distinct sonic effect as a result of overheating. The grain sizes of the A289 material were generally larger then those obtained with the other steels.

Reflectograms for the austenitic A289 steel show a different result than that observed for the other steels. Although some of the patterns approach the result obtained with overheated 1045, a final interpretation of the variables could not be resolved in the present program.

Since the wholly austenitic A289 material represents a marked departure from both the martensitic and ferritic materials in chemistry and structure, these factors may have influenced the results obtained.

The author wishes to thank Mr. L. Reyt and Mr. J. Dedinas of our Research Laboratories, and Mr. J. Burke of the Non-Destructive Test Section, Inspection Department, for help in this investigation.

2250° F



MATERIALS AND HEAT TREATMENTS

Material	Sample	Heat Treatment	Grain Size	Average Diam., in.
SAE 1045	A	Hot Rolled	6	0.0025
	B	1450° F, Furnace Cool	7	0.00125
	C	1600° F, Furnace Cool	6	0.0025
	D	1750° F, Furnace Cool	4-5	0.00375
	E	1900° F, Furnace Cool	3	0.0050
	F	2250° F, Furnace Cool	1	0.0112
SAE 4140	A	Hot Rolled	—	—
	B	1450° F, Furnace Cool	7	0.00125
	C	1600° F, Furnace Cool	6	0.0025
	D	1750° F, Furnace Cool	4-5	0.0040
	E	1900° F, Furnace Cool	3	0.0050
	F	2250° F, Furnace Cool	2	0.0075
410 Stainless	A	Hot Rolled	—	—
	B	1450° F, Furnace Cool	—	—
	C	1600° F, Furnace Cool	—	0.0006
	D	1750° F, Furnace Cool	7	0.00125
	E	1900° F, Furnace Cool	2	0.0075
	F	1625° F, Furnace Cool	2	0.0075
Austenitic Steel	A	2000° F, Furnace Cool	1	0.018
	B	2100° F, Furnace Cool	—	0.028
	C	2200° F, Furnace Cool	—	0.035

WHAT THIS STUDY FOUND

1. Grain sizes produced by good standard heat treating do not affect the ultrasonic test.
2. Overheated or mis-heat treated steels with an average grain size of 0.010 in. diam or larger show sonic indications due to grain size.
3. Grain size to wave length ratios of 15:1 or greater produce no effects. Ratios under 15:1 have an increasingly adverse test effect.
4. Type of microstructure has no effect on sonic test result.
5. Loss of back reflection is the only apparent sonic indications resulting from extremely large grain size (ratios of 14:1 to 8:1).
6. Knowing heat treatment and microstructure should determine whether loss of back reflection is due to grain size. Indications between initial pulse and back reflections are not due to grain size.

On heavy equipment—

Machinery Repairs by Thermit Welding Withstand Severe Service

♦ Thousands of dollars and months of downtime may be the price when a heavy piece of forge shop machinery becomes damaged . . . Both cost and downtime can be cut substantially by repairing the broken part by thermit welding.

♦ DROP HAMMERS, upsetter machines and other forge shop equipment are heavy, expensive machines—usually built to order. Replacement of a damaged machine may take months of time and carry a price tag running into the thousands. Add to this the heavy losses for downtime and you have an expensive deal. Yet, in spite of the severe service to which forging machinery is subjected, it can be repaired quickly, permanently and economically by thermit welding.

Savings in time and cost alone, compared with replacing the equipment, are usually substantial. For example, when the end of a cast steel anvil on a 12,000-lb drop hammer broke off in a Pennsylvania forging shop, it would have cost about $23,000, plus freight, to replace the anvil. Moreover, a replacement could not be made in less than six months.

The shop undertook to repair the anvil by thermit welding. It was done successfully and as a result the hammer was back in service in about three weeks. Total cost of the job was a little more than $12,000. Taking into account the possible loss of production, total savings were well over $100,000.

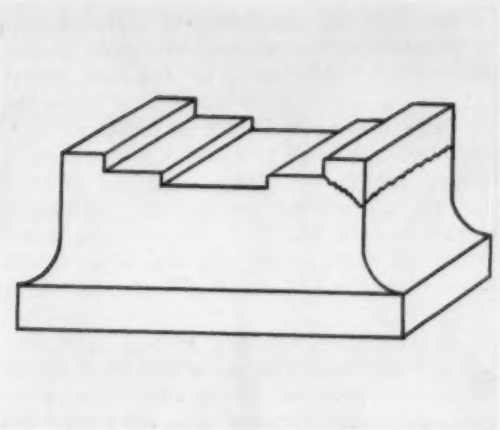
The weld was made with the anvil in place. An excavation was made around the anvil to a depth just below the bottom of the base and the usual mold box constructed. A wooden form to contain the wax pattern was built and smoothed off to dimensions. After ramming the mold, slow heat was applied around the entire anvil.

To prevent fracture of the huge steel block, no direct heat was allowed to touch the anvil in the beginning. It was subjected only to hot fumes for 48 hours. At the end of this time, the whole anvil had reached a temperature between 900° and 1000°F.

Repair stands heavy service

Preheating inside the mold was then started. Several hours later, the weld was poured, using 4000 lb of thermit material, reacted in two crucibles. Reaction and pour were normal. Three days later the mold box was removed. A portable planer was set up and the end was accurately machined to fit the column when it was put in place. After reassembly, the hammer was put back in production on very heavy forgings and has since given a long service life without any signs of failure.

Routine procedures have also been worked out for repairing broken hammer rams by thermit welding. In repairing a ram broken through on one side of the piston rod hole only, a gap must be prepared. This may be cut out by torch after heating the ram to 500° to 600°F or on a planer without preheating. Two or three steel plugs



REPAIR of broken edge on hammer anvil cost $12,000. Replacement would have been much higher, with downtime estimated at 6 months.

LARGE drop hammer ram such as this can be returned to service quickly by thermit welding. Rams are also made by welding two forgings.

should be inserted in the gap to simulate a solid section, but arranged to restrict the gap as little as possible. The ram is then set up with the weld in a vertical position and the mold box constructed.

Special precautions must be taken in the hole of the ram to avoid resistance to normal shrinkage when the weld is completed. To accomplish this, a steel plate is inserted in the hole at the center. By ramming this in the usual manner, a good resistance to preheat and metal flow is provided. The plate is then withdrawn from the rear and the remaining half filled with molding material very loosely rammed.

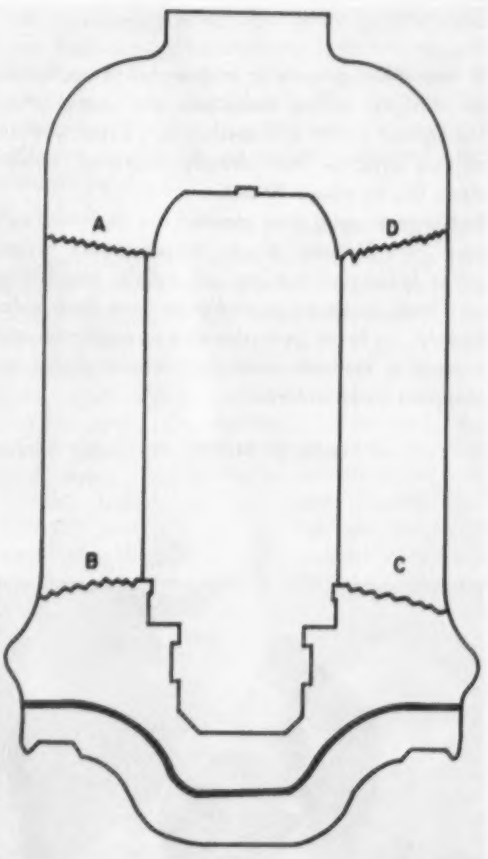
Slow heat necessary

A brick furnace can then be constructed around the exposed part of the ram and slow heat applied. No direct heat should be allowed to contact the ram when the heat is first applied as this could fracture the ram. When the temperature reaches 1400° to 1500°F, preheating may be started in the inside of the mold box.

After pouring the weld, external heat is continued for two or three hours to allow the weld area to reach the same temperature as the rest of the ram. The entire mass is allowed to cool until the next day. The ram will still contain considerable heat, but the piston rod hole should be cleaned out at this time. A weld of this nature requires reheating to about 1650°F to further refine the grain structure of the metal.

Upsetter main housings, crankshafts, die slides, tie bars and the like seldom require reheating after welding, and the machinery very often can be returned to service in a matter of hours, or at most a few days.

Cast steel housings which have been fractured are now being repaired successfully as a routine practice.



WITH BREAK AT A in this steel mill housing, heat of thermit welding will travel in both directions from weld area. To counteract expansion and eliminate undue stress around top of housing, apply heat between A and D. Also apply heat between B and C to equalize shrinkage. Breaks at B, C and D are handled by a similar procedure.

In materials, processes, design—

SAE Outlines Automotive Future Through New Developments

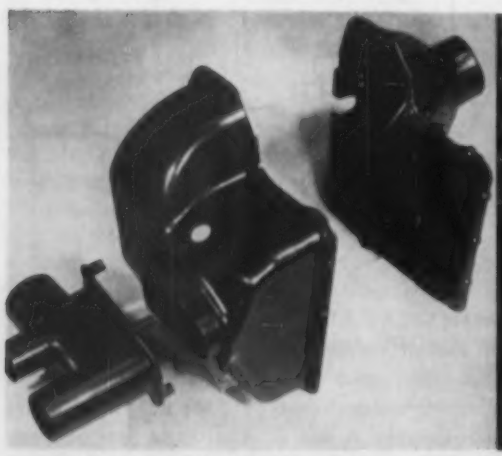
◆ New developments in engine design, materials, die designs, testing techniques and many others highlighted recent SAE sessions . . . Better vacuum melting practice has already improved turbine blade life by about 90 pct.

◆ Aluminum may find greater use in tomorrow's cars . . . Cylinder blocks, wheels, brake drums, grilles, knobs and housings are definite possibilities . . . Tests on aluminum radiators have been satisfactory . . . Better understanding of properties and processing methods makes reinforced plastic an accepted body material.

By W. G. PATTON, Asst. Technical Editor

◆ METALLURGISTS and metalworking executives attending the SAE 50th Anniversary meeting at Atlantic City recently found enough thought-provoking material for many months to come. Subjects on the agenda ranged from "Materials and Processes for Tomorrow" to "Making Manufacturing Research Programs Pay Dividends."

Automobile designers and engineers were offered an equally full program, including discussions of new computation and instrumentation techniques, passenger car suspensions, fiber reinforced plastic panels, automatic greasing systems, new cooling systems for cars and recent brake developments. Also included were auto-



ONE FIRM has used fiber glass reinforced plastic to make more than 2½ million such parts.

ALUMINUM will have many applications in the car of the future. These are now practical.

motive safety problems and the first detailed reports on operating costs and performance of trucks equipped with automatic transmission units.

A discussion of high temperature alloys by F. N. Darmara, Utica Drop Forge and Tool Corp. brought out that service life of gas turbine blades made by vacuum melting has been increasd up to 90 pct. Also, that vacuum melting results in considerable improvement in the recovery of costly elements used for high temperature alloys.

Another area of progress being made in jet engine blade production is reduced die cost. For some applications, die life has been improved 25 to 50 pct while simultaneously reducing die cost from 40 to 50 pct.

At the same session, M. E. Nevins, Wisconsin Centrifugal Foundry, Inc., pointed out that, thus far, production of titanium is out-running its actual use more than 20 times. While the "wonder metal" has been indispensably useful for many applications, much realistic work remains to be done.

L. F. Swoboda of Kaiser Aluminum and Chemical Sales, Inc. has much enthusiasm for the future of aluminum in automobiles. As he sees it, aluminum cylinder blocks, wheels, brake drums, trim, grilles, knobs, clutch housings and even bumpers are distinct possibilities for the future. Recent developments have reduced costs of tooling and welding flux to a point where aluminum radiators will be considered competitively. Their performance under many different operating conditions has been satisfactory. There is a possible saving of $4 per radiator and a 12 lb decrease in weight through the use of aluminum.

Aluminum engines under test

Other potential automotive applications for aluminum include diecasting, screw machine parts, electrical wiring and battery cables and head lamp retainer rings.

. It was also stated that a diecast experimental engine made of aluminum offered a weight saving of 75 lb over a conventional engine. A sand cast prototype with inserted cylinder liners is already under test by Willys Motors, Inc.

J. G. Seiter, F. J. Stokes Co. reported many significant developments in vacuum metallizing of aluminum. The process is fast and applicable to a wide variety of part designs and materials. The cost of vacuum metallizing at $3 compares with $7 for silver reduction and $14 for electroplating where buffing and polishing are necessary. While most present applications are for interior parts, some exterior components are being vacuum metallized.

A panel consisting of J. Crawford, Cincinnati Milling Machine Co.; C. P. Brooks, Austenal Laboratory; W. Hausler, Utica Drop Forge and Tool Co.; W. M. Williams, Thompson Products, Inc. and L. Zimmel, Ex-Cell-O Corp. discussed the timely topic,"Manufacturing Research Pays Dividends." Each described the development of a machine or new process by his firm which has more than paid for itself. A typical example is the substitution of a continuous broach for five standard vertical broaches. The new machine occupies less floor space, requires less capital and can be run by an unskilled operator. It was brought out that long range planning on new tooling is a must.

Fiber glass reinforced plastic has become an accepted automobile body material. Physical properties of plastics are now much better understood, materials have improved and handling is more efficient. Better tooling is now available.

Matched dies offer many advantages

It was pointed out that matched dies for plastics now being used are made either of steel or alloy iron. Deep dies have their own heating chambers, using steam at 20 psi or more. Shallow dies do not require coring for steam.

Matched metal dies are seldom practical where the quantity of parts is less than 300, according to R. Morrison, Molded Glass Body Co. For short runs, hand-lay-up, vacuum bag, pressure bag and other methods can be used. Advantages of matched dies include higher quality parts, higher glass content, higher strength, better surface and void-free parts of controlled thickness and dimensions.

Have design limitations

Depending on the size and design of the part, either of preform or mat may be used. As in the case of steel, there are many limitations in design that have to be observed in forming reinforced plastics in matched dies.

An outstandingly successful application of matched metal die molding of premixed reinforced plastic molding compound was described by J. Greig. Up to the present time, his firm, Woodall Industries, has made more than 2,500,000 parts with plastic materials, requiring more than 12 million lb of molding compound. The firm uses more than 60,000 lb of plastic material every working day.

Properties of fiber glass reinforced plastic were described by J. G. Coffin, Chevrolet Motor Div. In summarizing, he said: "We are confident that these new engineering materials (plastics) have a permanent place in the automotive industry to the extent that we are continually broadening our coverage of specifications and undertaking investigation of the many aspects we do not adequately comprehend at present."

A. J. Carter, Chrysler Corp., reported that his firm, Chrysler Corp., is now producing housing and duct system of plastic. Initially designed in steel, this assembly would have involved 15 major stampings and more than 100 minor parts. The plastic housing and duct system is made of only two basic units. Moreover, it eliminates some troublesome assembly and sealing problems.

In a 25-year period, average horsepower has been increased by 85, compression ratios jumped from 5:1 to 7.8:1 and cars now get five more miles per gallon of gas.

Chevrolet is using reinforced plastic for a low volume body panel for a special pickup truck. Use of plastics converts a standard pickup truck into an attractive model with special styling treatment.

Some of the present limitations of plastics were pointed out by C. Jakust, Chevrolet Motor Div. Instead of springback, a problem with steel, the molder has the problem of distortion during cooling. The use of high-temperature bake enamels may create special distortion problems.

A progress report by Holzwarth, Thomson and Boegehold of General Motors on corrosion problems in automation climaxed an investigation started in 1947. Key to this progress has been the development of an accelerated test for simulating sheltered corrosion. Bare steel panels, suspended in a constant temperature cabinet at 125°F, are corroded by passing humid air over the test specimens. Relative humidity of the air is cycled between 100 pct and 10 pct in 8 hr. Once each day the samples are wetted with a dilute salt solution.

Alternate moistening and partial drying in the presence of an electrolyte produces a nonprotective rust nearly identical in composition and crystalline form to the corrosion products associated with auto body service failure.

Carbon potent element in tests

The effects of common alloying elements on corrosion resistance, according to their effectiveness, are carbon, phosphorus, manganese, copper and silicon. Nickel and chromium do not contribute to protective rust formation under the conditions of sheltering action as experienced in the GM tests. Carbon, which produces no noticeable improvement in outdoor tests, was the most potent element in reducing corrosion under the conditions of the GM cyclic humidity test. However, carbon additions cannot be used because of poor forming characteristics. Phosphorous additions show considerable promise.

Protective treatments for steels to be used at temperatures up to 1000°F were discussed by H. J. Noble and W. H. Sharp, Pratt and Whitney Aircraft Div., United Aircraft Corp. They described the selection of steels, emphasizing the role of martensitic chromium steels and established the ranges in which these steels may fail because of stress-corrosion.

In another phase of automotive research, A. M. Smith, Ford Motor Co., reported on the use of radioisotopes to measure rotation of piston rings, gasket leaks, mixing of liquids and wear problems.

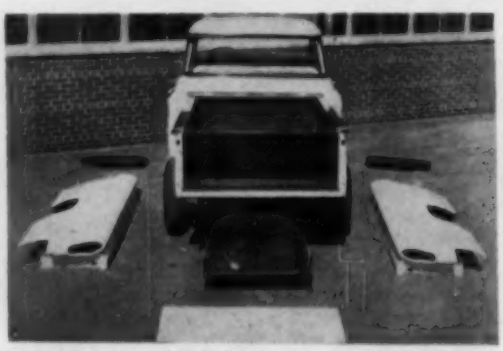
Chrysler engineers reported the following benefits from the use of a diecast aluminum torque converter housing: (1) less machining stock required, (2) minimum section thickness, (3) many surfaces are cast to size, (4) improved coring accuracy, (5) high production rate per die cavity, (6) smooth surfaces, and (7) greater ability to produce complex shapes. Diecast parts are also easier to handle and machine and give longer tool life.

Some interesting facts on 18 cars were presented in a paper by Caris, Mitchell, McDuffie and Wyczalek of General Motors titled,"Mechanical Octanes for Higher Efficiency." It reveals that since 1930, average car weight has increased from 3500 lb to 3950 lb. Today's large cars are shorter and the small cars are longer than in the 1930's although the average wheelbase has increased only about 4 in. during that time.

Horsepower, compression ratios jump

From a little less than 75 in 1930, average horsepower has been increased to 160. Compression ratios have gone up from 5:1 in 1930 to 7.8:1 in 1955. Average miles per gallon have also increased from about 15 in 1930 to 20 in 1955. Other interesting facts were given on octane numbers, compression ratio, valve timing and combustion chamber design.

Lively, but controversial, interest developed over a paper describing a German Diesel engine which is claimed to operate without smoke or knock on a wide range of fuels. It provides for fuel vaporization in the presence of little air and at low temperatures instead of seeking instantaneous combustion through air distribution and an "ideal" air-fuel mix. Unconfirmed reports say that a prominent U. S. farm equipment manufacturer has arranged to build the new German engine. Engines of this type are said to be suitable for passenger cars.



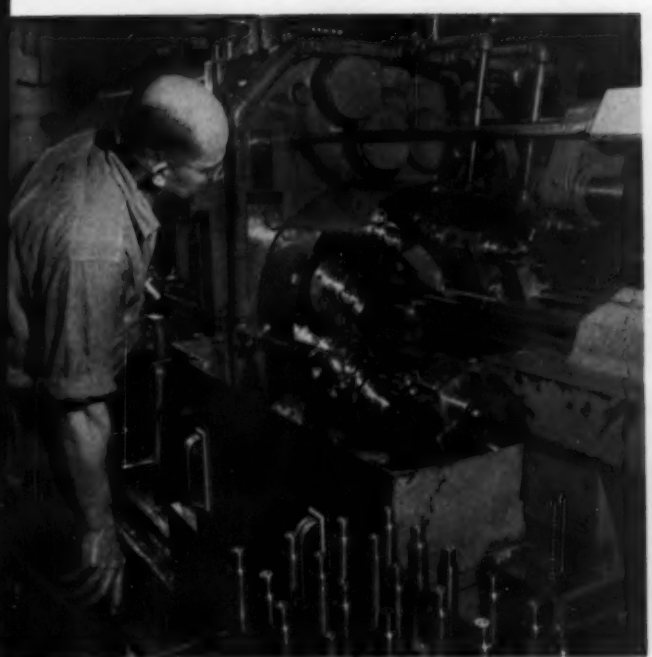
REINFORCED plastic body panels quickly convert light pickup truck into an attractive model.

Less floor space—

Multiple-Spindle Machines Boost Output Four Times

◆ Higher production, less floor space and downtime are benefits achieved at Ford Motor Co. through the use of automatic chucking machines . . . In machining the head end of standard transmission main drive gears, the 8-spindle units have increased production about four times . . . Machine rigidity and other features contribute to close machining accuracy.

By E. C. BEAUDET, Technical Editor



OPERATOR about ready to unload part from the first station and reload it with rough stock. Operator is looking at main drive gear.

◆ SELECTION of an 8-spindle automatic chucking machine for turning the head end of standard transmission main drive gears is paying off in greatly increased production at Ford Motor Co.'s Standard Transmission and Radiator Plant.

Added to the higher output, this extremely rigid equipment permits considerable savings in floor space. Two of the automatic chucking machines replace eight automatic lathes formerly used on this operation and produce the same number of parts.

Other advantages of the setup include the use of fewer cutting tools, and less handling, tool changing and setup time.

Machined at peak efficiency

The part shown on p. 105 is machined at a rate of 140 pieces per hour at 100 pct efficiency on a New Britain Model 86 automatic chucking machine. In production, output per machine averages about 97.6 per hour.

The piece, made of 5135 steel, is annealed to a hardness of 176 to 217 Bhn. Cutting tools used are a combination of carbide, cast alloy and high speed steel selected to meet cutting requirements and to balance out all machining operations timewise. All tools are inserted and retracted at the same time.

A total of 16 cutting tools are used on each machine as compared to 21 required on the former equipment. Sequence of machining operations and number of cutting tools used are shown on p. 105.

The dove tail form tool is made of cast alloy material, single point tools are carbide and blade tools, drills, reamers and recess tools are high speed. Each operation is flooded with a standard water soluble coolant supplied by a low pressure pump of 85 to 125 gpm capacity.

Easy operation featured

An important feature of this equipment is its open-end construction which makes all machining stations accessible to the operator. Machine guards are removed easily to permit the operator to change tools easily.

Parts are loaded at the first station into an hydraulically operated chuck. The hydraulic system provides chucking pressures up to 500 lb per sq in. and permits rapid operation as soon as a control valve is opened.

Chucking pressures can be reduced automatically at the last three stations to maintain tolerances on finishing cuts which might be thrown off by the heavier chucking pressures required in heavy turning.

Chucks can be opened in any position by actuating a hydraulic control lever. When the part is loaded the spindle is started by shifting the lever in the opposite direction. A safety latch prevents the spindle from starting until the chuck is closed.

CLOSEUP of tooling area shows chucking method used in machining main drive gear. All stations are visible except the first station.

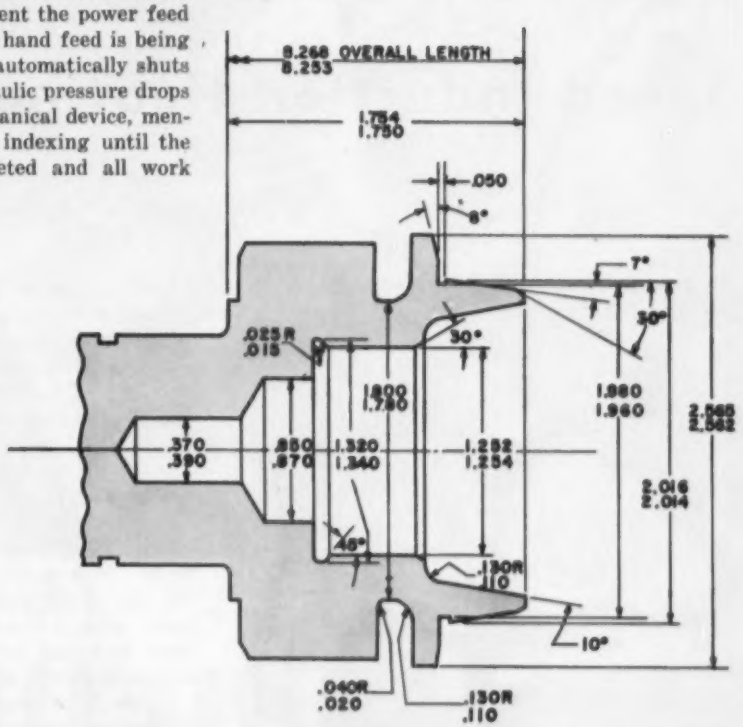
Spindle speeds used in machining the part are 286 rpm to make most efficient use of the different types of cutting tools. Each unit is powered by driving motors capable of providing 20 to 75 hp over a range of 1160 to 1750 rpm.

Another feature of the automatic chucking machine which contributes to machining accuracy is automatic lifting of spindle carriers during

TOOLS used at each of the seven cutting stations of the automatic chucking machine. Gages at right check finished dimensions.

indexing and automatic clamping after to prevent weaving during cutting and also to reduce wear on locating points. Both spindle speed and feed changers are through heat-treated pick off change gears which permit selection over a wide range.

A number of safety devices are built into the machine to protect the operator. These include: an interlocking device to prevent the power feed from being engaged when the hand feed is being used; a pressure switch that automatically shuts down the machine if the hydraulic pressure drops below safe limits; and a mechanical device, mentioned above, which prevents indexing until the chucking operation is completed and all work fixtures closed.



HEAD END of standard transmission main drive gear machined on multiple-spindle unit.

Machining Sequence

Preliminary Operation

Rough and semifinish turn 7° cone diameter and form relief for clutch teeth.
Drill, counterbore, internal recess and ream.
Finish turn clutch gear diameter.
Locate against bearing face with cone end out.
Pilot in bottom of shank.

STATION 1

Load and unload

STATION 2 (4 Tools)

Drill bearing diameter half way
Rough form relief for clutch teeth
Rough face end
Rough turn clutch diameter

STATION 3 (2 Tools)

Rough turn cone diameter
Rough finish form face
Step drill

STATION 4 (2 Tools)

Drill 0.38 in. diam. to depth
Rough turn taper on 7° cone diameter
Semifinish front face of clutch gear

STATION 5 (3 Tools)

Counterbore 1.76 in. diam. x 10° taper
Finish form relief for clutch teeth
Form 3° chamfer on end of taper
Finish turn clutch gear diameter

STATION 6 (2 Tools)

Semifinish bearing diameter chamfer—
Finish face clutch gear
Finish face end
Form dimension on clutch gear end face

STATION 7 (1 Tool)

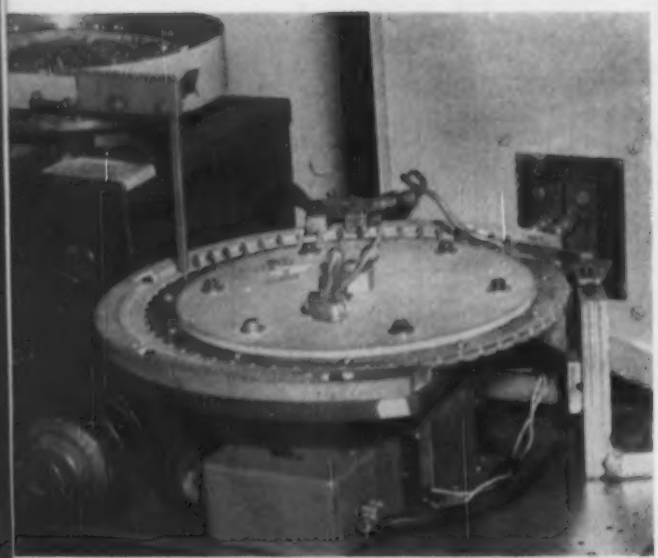
Recess counterbore

STATION 8 (2 Tools)

Semifinish ream bearing diameter
Semifinish turn taper on 7° cone at large end

For small parts—

Automatic Devices Speed Induction Heating



VIBRATING hopper, magazine and vertical chute feed parts to dial for induction annealing.

◆ MANY HUNDREDS of different parts for business machines pass through the heat treating department at International Business Machines Corp.'s, Endicott, N. Y., plant. Lots vary from small to large and processing rates must be adjusted accordingly. Numerous parts are induction heated and, of these, a few are adapted to fully or semi-automatic cycles.

One fully automatic setup for bulk-loaded parts includes a Syntron hopper, a magazine and a vertical tube all arranged to feed parts automatically into the recesses of a dial fixture that turns continuously.

Parts picked up by the dial advance through an induction heating coil. The coil is designed to produce a certain temperature in a given section of the part during the brief passage interval. Thereafter the part cools as the dial continues to turn, and is eventually ejected to slide down a chute into a tote box.

Beryllium copper plug-board contacts are processed in this manner. Only a 1/16 in. length on one end of each contact is annealed at 1200-1300°F, leaving the remainder of the spring hard. Input to the induction coil is only 2½ kw, and the production rate is approximately 15,000 pieces per 8-hour shift.

Much higher rates are attained on other parts when the coil input is stepped up to as much as 20 kw. Size of the dial, its rate of rotation and the type of coil used are also varied to adapt the basic setup to other parts. Of course, the parts must be suited for hopper feed and the magazine must also be adapted to their size and shape.

Aside from annealing, mechanized induction heating setups are also applied to parts that are to be hardened, either locally or completely. Work pieces drop automatically into a quench tank after they are heated to specified temperature. Such equipment is confined to parts used in large enough volume to justify the setup cost as well as the time necessary to make changeovers from one job to the next.

So-called spool gears, whose teeth must be hardened, are typical of parts that are heated and quenched as described. The specially-designed induction coil is completely enclosed and is in line beneath a vertical tube which feeds hand-loaded spools successively and automatically into heating position. An electric timer limits the heating cycle to two seconds, after which the part is automatically released and falls into the quench. To start another cycle, the next spool automatically drops into the coil and comes to rest. Production rate is about 25 pieces per minute.

This setup is used for other parts simply by making suitable changes in the feeding tube, coil design, timer interval and energy input.

Production can be increased in some instances by using a core whose high magnetic properties improve the heating rate. In such cases the core must be water cooled and the part well adapted to the setup.

From the collection of Lewis Winant, New Jersey Arms Collectors Club. Maker: Wogdon, London, 1786-1787. An 11-by-14 inch print of this illustration will be sent free when requested on company letterhead.

challenge accepted

When this booster rotor, an artillery fuse component, was offered for production to the powder-metallurgy industry, Bound Brook was among those who were quick to accept the challenge. Initially, the part had been produced by machining brass bar stock, a method which proved to be both excessively costly and discouragingly slow. Powder metallurgy fabrication looked simple enough at first, until the critical weight and dimension factors were examined more closely—for in artillery fusing the difference between a hit and a dud can depend on a thousandth of an inch. By mustering all of its know how, accumulated in more than 30 years of producing metal-powder parts, Bound Brook emerged as the major producer of this rotor—at a cost nearly 40% less than was required for conventional machining.

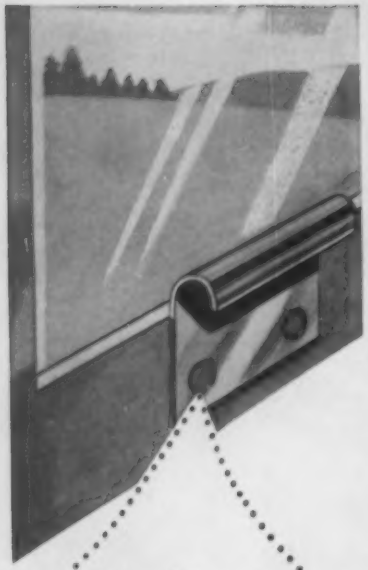
10

BOUND BROOK

BOUND BROOK OIL-LESS BEARING CO., EST. 1883, BOUND BROOK, N. J.

Pioneer in

POWDER METALLURGY BEARINGS + PARTS



An Alcoa Aluminum Fastener should be used here!

It's an aluminum window-lift assembly, worth the lasting strength of Alcoa® Aluminum Fasteners. You avoid galvanic and atmospheric corrosion. You get perfect color match; you get the very highest quality product. Your local Alcoa distributor has a complete stock.

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New Technical Literature

Catalogues and Bulletins

Speed changers

Operating advantages of "Vari-Pitch" speed changers are described in a bulletin. Available in 12 sizes from 1 to 75 hp with output speeds ranging up to 2900 rpm, these speed changers operate in either vertical or horizontal position. They can be made suitable for reversing service with the addition of a simple, low-cost tension stabilizer. *Allis-Chalmers Manufacturing Co.*

For free copy circle No. 1 on postcard, p. 113.

Basic steel products

Identified as a buyers' guide to bars, structurals, plates, sheets and strip, this bulletin gives information on standard specifications to which these steels are made; type, range, and accuracy of cutting to users' needs; and opportunities to save money by combining orders for these products. *Joseph T. Ryerson & Son, Inc.*

For free copy circle No. 2 on postcard, p. 113.

Hand hoists

Lightweight spur geared all-steel hand hoists are detailed in a booklet. The advantages are described in detail. It is adaptable to many close-quarter applications. Clearance data, price list and specifications are included. *Chester Hoist Div., The National Screw And Mfg. Co.*

For free copy circle No. 3 on postcard, p. 113.

Spot welder

Bulletin 334-3 completely describes the air operated, press type, patented three-phase Modu-Wave spot welder, the so-called "standard of the aircraft industry." This brochure includes illustrations, charts, photographs, schematic drawings and tabular data. *Sciaky Bros., Inc.*

For free copy circle No. 4 on postcard, p. 113.

FOR YOUR COPY

Money-saving products and services are described in the literature briefed here. For your copy just circle the number on the free postcard, page 113.

Pressure pickup

Described in a bulletin is Type 4-314 pressure pickups, useful for almost any application which requires measurement of low differential pressures. Actual size photographs are included in the bulletin. Specifications and special features are also given. *Consolidated Engineering Corp.*

For free copy circle No. 5 on postcard, p. 113.

Slotted angle

Dexion slotted angle—a new all-purpose steel fabricating material—has captured the imagination of industry and business throughout the world because of its amazing versatility, ease and speed of assembly, strength and rigidity, attractiveness, and because it is 100% reusable. An interesting illustrated folder describes some of its many uses. *Acme Steel Co.*

For free copy circle No. 6 on postcard, p. 113.

Motor generator sets

A new 4-page bulletin shows construction and specifications of high frequency M-G sets for induction heating and melting applications. Basic technical data and cross-section diagrams fully describe the totally enclosed water cooled units. *High Frequency Heating Div., Lindberg Engineering Co.*

For free copy circle No. 7 on postcard, p. 113.

FREE TECHNICAL LITERATURE

Power drive cylinder

Two booklets are being offered: an 8-page booklet on the company's new NP power drive cylinder and a 4-page booklet on their pneumatic-hydraulic transmission systems and components. The power drive cylinder has a compact design, rust-proof construction, and sealed-in lubrication. Schematic drawings are contained in both booklets. *Industrial Actuators and Controls Div., National Pneumatic Co., Inc.*

For free copy circle No. 8 on postcard, p. 113.

Pipe line filters

Type PL pipe line filters, designed for removal of water, oil, dirt and pipe scale from compressed air or gas lines, are detailed in a brochure. The filters have been engineered for pressures up to 150 lb gage. Standard models are furnished for pipe sizes to 2" while special models are available to 6" pipe size. The literature includes design features, engineering, operating and application information. *Air-Maze Corp.*

For free copy circle No. 9 on postcard, p. 113.

Coatings

New bulletins describe the company's Lyfanite processes, corrosion resistant phosphate coatings for aluminum, ferrous, and other metal surfaces. These coatings provide excellent bonding properties and resistance to corrosion under salt spray and humidity tests, and are the best foundation for a high quality paint finish, greater adhesion and paint durability. *Neilson Chemical Co.*

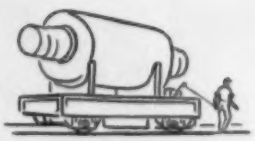
For free copy circle No. 10 on postcard, p. 113.

Materials handling

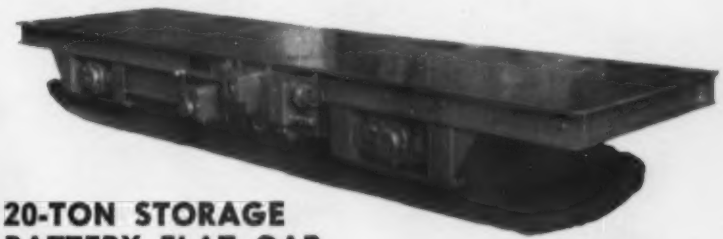
Wasted manhours and interruptions in the flow of materials from receiving through processing were serious problems facing one company. Details on how three fork lift trucks unload freight cars four times faster, and how storage capacity has increased 1/3 with high-stacking of materials, are contained in a special report. *Towmotor Corp.*

For free copy circle No. 11 on postcard, p. 113.

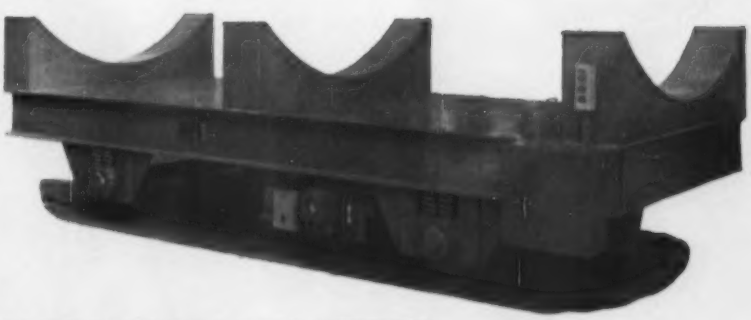
ATLAS SAFETY TYPE "SHORT HAUL" TRANSFERS



Atlas Safety-Type Transfers provide safe, low-cost service. Available with gas or diesel-electric, cable reel, or storage battery power. Atlas Transfers handle any type of load . . . and the heavier the load, the greater the savings.



20-TON STORAGE BATTERY FLAT CAR



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Your workers will say they never had comfort like they get in the new Willson Contour-Spec—and its new hinged bridge adds an extra measure of protection, too!

It's the *hinge* that permits equal pressure at every point of contact with the face . . . snug comfort regardless of facial contour! And it's the hinged bridge that means extra safety because there are no dangerous gaps around the eyes.

Contour-Specs conform to *any* face—heavy, lean, round, long or bony! Result is, a new concept of comfort combined with protection that encourages workers to wear them willingly.

Let them try Contour-Specs—see how well the 47-mm. lenses suit every eye size—feel how easily the lightweight, snug-fitting Butyrate plastic frame "sits" without pressure anywhere. Order a supply from your Willson distributor now.

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FREE TECHNICAL LITERATURE

Firebrick

A 28-page bulletin entitled "B&W firebrick" has been published by the company's Refractories Division. It lists and discusses properties and characteristics of Allmul, Allmul-D, 80, 80-D, and Junior Firebrick. Typical applications of these firebrick in a wide variety of industrial furnaces are discussed and illustrated. *Refractories Div., The Babcock & Wilcox Co.*

For free copy circle No. 12 on postcard, p. 113.

Deburring machine

A production hypoid pinion deburring and chamfering machine, recent addition to the Burr-Master line, is described in a bulletin. Production rates exceed 200 pinions per hour at each station on the machine that: 1. burrs and chamfers acute angle profile and part of root at toe end of each tooth, 2. burrs and chamfers acute angle profile and part of root at heel end of each tooth and 3. chamfers peripheral chamfer on large end, when required, removing sharp edges. *Modern Industrial Engineering Co.*

For free copy circle No. 13 on postcard, p. 113.

Oil-hydraulic lifts

The field of heavy-duty oil-hydraulic lifting devices for industrial use is completely covered in a catalog. This 20-page book contains illustrations of various sizes and applications of Rotary Levelator lifts. It is a valuable source of ideas and suggestions for solving innumerable lifting problems. *Rotary Lift Co.*

For free copy circle No. 14 on postcard, p. 113.

Universal joints

The constant velocity universal joint for small applications is described in a catalog sheet. This new miniature is designed for small universal joint applications which demand compactness and ruggedness. Manufacturers of aircraft, ordnance and ordnance stores, machine tools, servo-mechanisms, automotive and farm equipment now use the Rzeppa OV. *The Gear Grinding Machine Co., Joint Div.*

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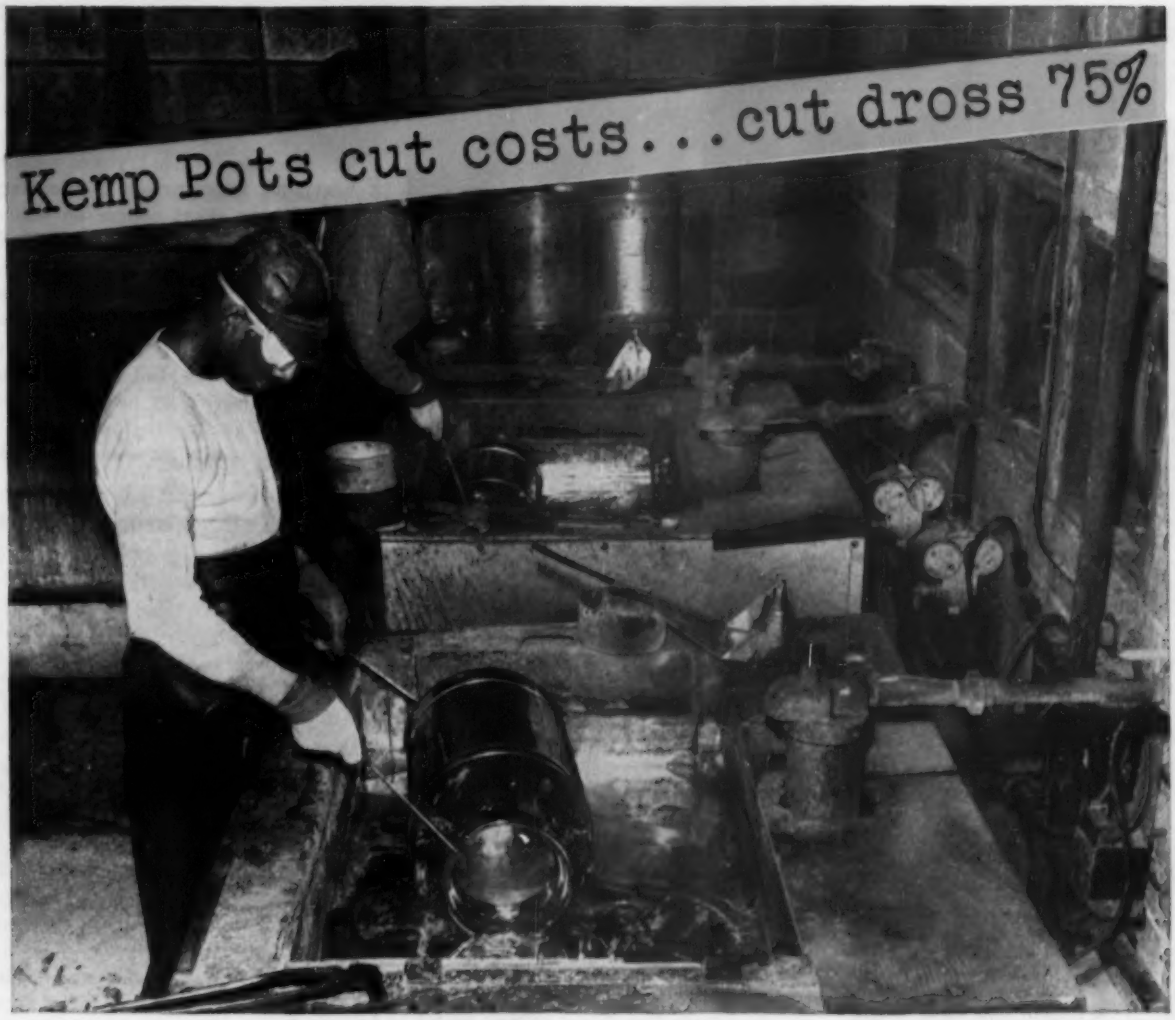

Springfield Can Co. reports: *Improved retinning quality at lower cost with Kemp Melting Pots*

Retinning dairy equipment is the main plant operation at the Springfield (Missouri) Can Co. Milk cans are treated in a retinning room where 2 Kemp Immersion Heating Pots melt block tin and keep it in liquid form for the operation.

Installed in January, 1955, the Kemp Pots have already proved superior to the old, externally heated pots in quality control. They have reduced dross formation 75%. The constant, even heat of Kemp Pots helps produce heavier tin coatings, which give the retinned cans the quality appearance and life of new cans.

Kemp Saves Fuel, Production Time

The Kemp units heat much faster than old-fashioned methods and maintain an even temperature. This means lower fuel costs as well as valuable production time saved. Mr. Jack Simon, Springfield Can Co. owner, sums it up by saying, "The Kemp Melting Pot is the finest produced!"

Kemp Can Help You

You benefit in many ways when you install Kemp Melting Pots: they are not subject to periodic and expensive breakdowns . . . offer greater heating surface, faster heat recovery, lower dross formation, even lower room temperatures—they operate continuously at maximum efficiency with a substantial saving in fuel costs.

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THIS PINT-SIZE ROLLING MILL MAY SAVE YOU KING-SIZE HEADACHES (AND MONEY TOO!)

At Inland, 'new ideas' are considered as vital a raw material in steelmaking as top grade iron ore and coal. Establishing reserves of this basic ingredient is a continuing job for Inland's research and development people. The new Inland Research Center in Hammond, Indiana, where Inland researchers look for better steels and more efficient ways to make them, is the most recent addition to Inland's 'new idea' resources.

We at Fenn are pleased to quote the foregoing from a recent advertisement of Inland Steel Company of Chicago. We are especially glad that Inland found, in Fenn rolling mills, the precision, flexibility and rugged dependability demanded in their research projects.

Fenn will design rolling mills for all special applications, in a complete range of sizes, and will furnish all accessories. Fenn mills have extra bearing capacity to take higher horsepowers, and are designed for year-after-year accuracy —owning cost is exceptionally low.

FENN

PRECISION ROLLING MILLS—TURKS HEADS—WIRE SHAPING MILLS—SWAGING MACHINES—ACCESSORIES

The Fenn Manufacturing Company, 314 Fenn Road, Newington, Connecticut

FREE TECHNICAL LITERATURE

Needle bearings

A comprehensive catalog conveniently presents design, application and use data for five types of needle bearings. It comprises in effect an engineering short course on bearings, and is organized for practical use in properly selecting Torrington needle bearings by type, size and suitability. Further convenience is assured by presenting on facing pages the dimensional data and visualization of product applications. *The Torrington Co.*

For free copy circle No. 16 on postcard, p. 113.

Temperature control

"Temperature control systems" is the title of a bulletin available to individuals interested in the application of automatic control to industrial process applications. Control terminology as well as rules to use as a guide for the selection of a proper method of control for process characteristics is part of this bulletin. Also contained is a complete explanation of the various types of control systems, ranging from two-position on-off to proportional position with automatic reset. *Barber-Colman Co., Wheelco Instruments Div.*

For free copy circle No. 17 on postcard, p. 113.

Slip roll formers

An illustrated 18-page bulletin presents the company's complete line of power and hand operated slip roll forming machines, series 6″, 4″, 3″, 2″, 1½″ and 1″. The bulletin also illustrates how Niagara pinch type rolls assure production of commercially true cylinders virtually free from flat spots. *Niagara Machine & Tool Works*

For free copy circle No. 18 on postcard, p. 113.

Filters, pumps

A folder on filters which help you to get brighter, cleaner plating solutions and faster plating operations with fewer rejects is available. Illustrated and described is the Speed-O-Plate agitator which assures heavier, smoother plating quickly and easily. *Alsop Engineering Corp.*

For free copy circle No. 19 on postcard, p. 113.

FREE TECHNICAL LITERATURE

These publications describe money-saving equipment and services . . . they are free with no obligation . . . just circle the number and mail the postcard.

This section starts on p. 108.

Plastics catalog

Seven new and improved transparent plastics are described in an illustrated 6-page brochure. Designed for better performance in industrial, commercial and home uses, these materials promise greater stability, increased safety, lower maintenance and other benefits. Their properties are described and applications suggested. Most outstanding of the new materials is Dura-lite, a clear strong thermoplastic which is readily machined, formed and fabricated. *The Homalite Corp.*

For free copy circle No. 20 on postcard.

Thread plug gages

A unique combination file folder and brochure describes and illustrates the Sossner line of Taperlock, Trilock and Wire Type cylindrical plug gages and thread plug gages. Information includes size range, tolerances, handle sizes, number lengths, and thread pitches. *Sossner Tap & Tool Corp.*

For free copy circle No. 21 on postcard.

Snap gages

A bulletin on roll thread snap gages, which provide a complete inspection of all the principal screw thread characteristics vital to dependable fasteners, is available. Gaging is unusually fast, easy and economical. Roll thread snap gages are widely used in the aviation and many other industries where dependability is of primary importance. *Pratt & Whitney Div. Niles-Bement-Pond Co.*

For free copy circle No. 22 on postcard.

Shielded enclosures

A catalog providing the greatest depth of engineering and application data ever available in the field of r-f shielded enclosures has been published. Every type of screened and sheet metal standard enclosure is covered individually, with insertion loss or attenuation curves for each room, and complete construction details illustrated by cut-away drawings. Engineering specifications and standard room size availability are presented in an easy-to-use form. *Ace Engineering & Machine Co.*

For free copy circle No. 23 on postcard.

Die set pullers

Two additional sizes of "Shur-Pull" die set pullers which have just been completed are illustrated and described in a circular, together with the original size. Complete information is included so the customer can easily determine which size of puller is required for his die sets. *Durant Tool Supply Co.*

For free copy circle No. 24 on postcard.

Portable spot-welders

Portable hand operated spot welding machines for a wide variety of applications are described in individual brochures. The welders feature a light built-in transformer, eliminating heavy link cables. Simple thumb action releases the lower arm, widening the electrode gap to more than four times normal distance, making access easy to difficult jobs. *Aro Spot Welders, Inc.*

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Inventory control

How inventory control can balance stocks and reduce costs for all manufacturing concerns is described in a 16-page illustrated brochure. The brochure describes the essentials of good inventory control. The manner in which the Kardex visible system exercises this control for either projected forecasts or past usage is described and illustrated. Other products and their functions in assisting manufacturers in establishing an all-inclusive inventory control program are discussed. *Remington Rand, Div. of Sperry Rand Corp.*

For free copy circle No. 26 on postcard.

The "600" group

An interesting little magazine published by George Cohen Sons & Co. Ltd. is available. The contents include articles on: a new approach to industrial building; wheel nuts —a proposition for P. M.; casting —then and now; mechanized coal handling, etc. *George Cohen Sons & Co. Ltd.*

For free copy circle No. 27 on postcard.

Hydraulic components

A 34-page, 2-color bulletin describes and illustrates the company's standard line of selector valves, restrictor valves, sequence valves, check valves, and shut-off valves. Line drawings, tables and flow charts give construction and operating specifications. The bulletin tells how the company's highly specialized engineering staff has solved or helped solve difficult problems, including the development of the first successful technique for plating chrome to aluminum. *Aircraft Products Co.*

For free copy circle No. 28 on postcard.

Engine lathes

A folder describes the many outstanding features of the new Cincinnati engine lathes. The tray-top engine lathe model LE is illustrated. General specifications, including capacity, headstock, thread and feed range are given. *Cincinnati Lathe and Tool Co.*

For free copy circle No. 29 on postcard.

FOR MORE LITERATURE
Many companies offer free literature and other information in their advertisements. For the names of these firms see the company listings in the index of advertisers.

Casting handbook

A comprehensive guide to the design and specification of aluminum and magnesium sand, permanent mold, and die castings was announced. Wirebound between stiff covers, the pocket-size booklet is designed for use as a handy reference. All of the factors entering into the successful sand, permanent mold or die casting of a light-metals part, including all methods and materials, are discussed. Of particular interest is a 28-page section devoted to the characteristics of all conventional aluminum and magnesium casting alloys and all the Elektron premium magnesium alloys. *Rolle Manufacturing Co.*

For free copy circle No. 30 on postcard.

Hydraulic test equipment

A 4-page folder covers the company's line of hydraulic test equipment. For the first time there is available a complete facility in one unit for testing hydraulic pressure and flow under controlled temperatures. Illustrations include: controlled temperature hydraulic test stand, basic hydraulic test stand, and high pressure pump test stand. *American Research Corp.*

For free copy circle No. 31 on postcard.

Portable compressor

"On the spot . . . air power package" is the title of a new 8-page flier recently released. This flier describes the 3R-36 cfm self-contained Spot-Air portable compressor. It also deals with the many tools it will operate. Actual on-the-job illustrations clearly point out the added advantages of this light-weight compressor on jobs where bigger compressors are not needed. *Ingersoll-Rand Co.*

For free copy circle No. 32 on postcard.

Kaydon ... precision needle rollers for high-torque Detroit universal joints

FOR dependable and economical performance, automotive designers and manufacturers use Kaydon high-capacity, precision needle rollers by the millions. These hardened needle rollers (Rockwell C, 60-64) are ideal for today's high-torque requirements in automotive and truck transmissions, both automatic and conventional, as well as steering gears and universal joints. Typical example is the Detroit universal joint, illustrated above. It's one of many designs manufactured by the Universal Products Company, Inc. of Dearborn, Michigan.

Kaydon precision needle rollers have a low coefficient of friction. They're available in 82 standard sizes, .0611" to .3126" diameters (tolerance .0002" on diameter), spherical, conical and flat ends. By using standard sizes that are now in volume production, you get the benefit of low-cost, high-quality production. If you need special needle rollers, Kaydon can make them to your specifications.

Whether you manufacture large or small universal joints requiring needle rollers . . . or require any type of ball or roller bearing for product application in aviation, agricultural, industrial, mining and other industries — it will pay you to contact Kaydon of Muskegon.

NEW ENGINEERING CATALOG!
For more information, ask for engineering catalog No. 61, detailing sizes, weights, quantities, capacity and design data.

THE KAYDON ENGINEERING CORP.
MUSKEGON • MICHIGAN

K-553

All types of ball and roller bearings — 4" to 120" outside diameter . . .
Taper Roller • Roller Thrust • Roller Radial • Bi-Angular Roller • Spherical Roller • Ball Radial • Ball Thrust Bearings

bright annealing of stainless steel

- Fully Automatic—no operating personnel required.
- High Purity—completely oxygen-free.
- Safe—NO explosion hazard.
- Economical—30% cheaper than dissociated ammonia.

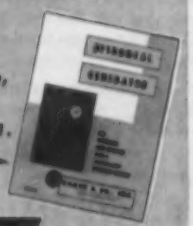
Units available in 100 C. F. H. to 10,000 C. F. H. capacities.

nitroneal gas generator

. . . produces pure nitrogen with a controllable hydrogen content that can be varied to meet changing requirements and maintained at any desired percentage between .25% and 25%. This flexibility permits the use of proper gas for any material or process at lowest cost.

Applications include bright annealing, heat treating and furnace brazing of stainless steel, low and high carbon steels and non-ferrous metals.

Write for free, informative booklet No. 21.



BAKER PRECIOUS METALS

113 ASTOR ST., NEWARK 5, N. J.
NEW YORK • SAN FRANCISCO
CHICAGO • LOS ANGELES

TOOLING: High Speed Cutting

New oxide-base material provides good cutting tool life at speeds of 2000 fpm . . . Still being tested, the material is more brittle than carbide . . . Improved finishes believed possible.

Successful initial development of a cemented oxide-base cutting tool material is reported by Carboloy Dept. of General Electric Co., Detroit. Still in laboratory stages, it represents that company's effort to keep pace with high speed machines currently under development by the machine tool industry.

Lab tests of the new tool material indicate it provides good tool life at speeds of 2000 fpm. At a feed of 0.005-in. and depth of cut of 0.100-in. at that speed, the tool lasts 27 minutes in machining 1045 steel, annealed to 170 Brinell.

Four Years In Works

The new cutting tool, under development since 1951, is made entirely of inexpensive materials, a factor which may possibly help lower tooling costs. Present cutting tools include such materials as tantalum, tungsten and cobalt, which are in relatively short supply, especially during times of emergency.

The new laboratory developed material is brittle, more susceptible to cracking than carbides and includes properties which must be thoroughly understood by the tool designer to take advantage of its capabilities.

Engineers point out that if the new tool material is successful in field tests, it may extend finishing ranges in machining in areas beyond those presently used. They also believe it will supplement carbides, much as carbides supplemented high speed cutting tools about 15 years ago.

Several machine tool builders plan to demonstrate the experimental cemented oxide-base material on their new high-speed machines during the giant national machine tool show in Chicago in September.

WANT MORE DATA?

You may secure additional information on any item briefed in this section by using the reply card on page 113. Just indicate the page on which it appears. Be sure to note exactly the information wanted.

Wire Drawing:

Begin making cables for big Mackinac bridge.

Wire drawing operations for the cables of the 3,800 ft suspension type center span of the Straits of Mackinac bridge have begun at the Trenton Works of the American Steel & Wire Div. of United States Steel Corp. The suspension cables, which total 12,000 tons of wire, comprise two separate 24 in. main cables weighing approximately 12 million pounds each.

Each Has 12,920 Strands

Wire drawing is being handled on a Vaughn 6 Spindle wire block machine with wire block motor controller, automatic synchronous motor starter, and circuit breaker panel designed and built by the Electric Controller & Mfg. Co. of

Draws at 700 fpm . . .

Cleveland. The machine with these controls permits wire to be drawn from approximately 0.350 in. down to 0.196 in. at speeds up to 700 fpm, according to Electric Controller engineers.

When completed, each 24-in. suspension cable will consist of 12,920 strands of 0.196 in. galvanized high tensile bridge wire, wrapped with a thread-laid cover of lower tensile galvanized wire.

Power:

Emergency power readily available with new unit.

A mobile power plant of unique design has been developed by Clark Bros. Co. of Olean, New York, one of the Dresser Industries. Called the Turbo-Mobile Power Plant, it is capable of developing 5500 kw of electrical power. The complete plant is mounted in a single railroad car and can be placed in operation after an absolute minimum of preparation. The 5500 kw plant is powered by a newly designed combustion gas turbine directly connected to a generator.

The unit, built for the Bureau of Yards and Docks of the United States Navy is designed specifically as a compact, mobile source of a large amount of electrical power which can be used if an emergency should occur. Even though it is an emergency unit, the power plant is of heavy duty design and can be operated continuously for the duration of the emergency.

Mobile Power Unit Needed

The Navy's Bureau of Yards and Docks is responsible for the technical control of the Navy's shore stations. Technical control covers a considerable amount of ground but basically means that the Bureau must see that proper equipment in the correct amount is operated in the proper way at the shore stations.

The Bureau was aware that on occasions additional power was often needed at various shore stations to meet emergency needs. Duplicate stand-by services were entirely too costly to maintain; therefore a mobile stand-by unit of

This paper products manufacturer tripled storage capacity with Towmotor high-stacking. Clamps are removed easily and interchanged with pallet forks or other job-planned accessories.

Stack to the ceiling...

Hold the line against costs by using all the storage space you have. You can do it easily with Towmotor Fork Lift Trucks. And Towmotor *mass* handles all types of material faster in all types of industries to save time and cost in receiving, processing and shipping operations. Write for certified Job Studies on your particular industry. TOWMOTOR CORPORATION, Div. 1507, 1226 E. 152nd St., Cleveland 10, Ohio.

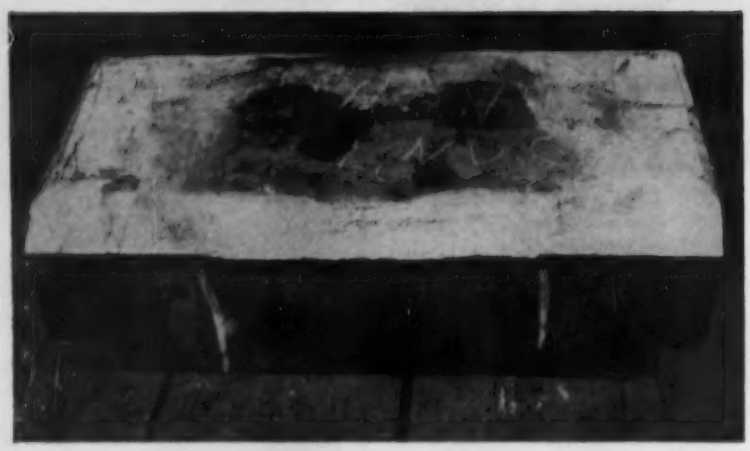
TOWMOTOR
THE ONE-MAN-GANG

FORK LIFT TRUCKS and TRACTORS — since 1919

TOWMOTORS are made only by TOWMOTOR CORPORATION

Extending die life with Crucible REXWELD. At points of greatest wear, the die face is undercut to a depth of ¼" below finish dimensions. It is then preheated to about 600F and hardfaced with REXWELD VT, using approximately twenty pounds of electrodes. The die is then cooled in air, and its surfaces ground to size. It is then ready for the press.

This REXWELDED die is shown after 11½ turns of continuous operation. During this period 155,000 pounds of steel were forged, 80% of which were *Superalloys S-816 and A-286*. At this point the press foreman reported a slight depression in the die face. *It had already given 400% greater service than had been experienced from untreated dies.*



Crucible REXWELD hardfacing rods keep dies in service 4 times longer...

This tungsten-bearing austenitic stainless steel die is designed for forging high-speed and high-alloy steels on a 1000-ton press. Normally, after only 1 to 3 eight-hour turns of production, it must be removed from the press and its surfaces replaned. And successive planing operations quickly reduce the die's thickness to below minimum limits, and it must be scrapped.

But by REXWELDING as shown above, die life is extended 400% or more. For REXWELD adds a surface that is even tougher, more wear-resisting than the original die material – and you can REXWELD again and again.

So when you have an application where surfaces must withstand wear or abrasion, try REXWELD. Your nearby Crucible warehouse has REXWELD low-hydrogen coated electrodes and bare rods in the sizes and grades you need. *Crucible Steel Company of America, Henry W. Oliver Building, Pittsburgh 22, Pa.*

CRUCIBLE first name in special purpose steels

Crucible Steel Company of America

Production Doubled

Cost Cut 50%

Product Improved...

TOCCO-METHOD

TOCCO heating station with inductor and fixture for silver brazing cylinder and cylinder cap assemblies.

with TOCCO* Induction Heating

The experience of The Commercial Shearing and Stamping Company, who use TOCCO for silver-brazing hydraulic cylinder assemblies, is typical of the benefits obtained by America's leading metal-working plants who use TOCCO Induction Heating for brazing, hardening, heat-treating, forging and melting operations.

More Production with TOCCO

a. Heating time per piece cut from 15.3 minutes to 2 minutes on 5¼" I.D. cylinder.

b. Machining and cleaning operations, formerly required, are not needed after TOCCO brazing.

Lower Costs with TOCCO

a. Through a reduction in time required for each piece.

b. Through the elimination of scrap and reworks.

c. Because, since TOCCO is automatic, operator need not be trained or especially skilled.

Improved Product with TOCCO

a. Because of better looks and sales appeal.

b. Because distortion is minimized.

c. Because of elimination of field failures due to severe stress pockets.

TOCCO Engineers— can probably find applications in your plant, too, where TOCCO Induction Heating can increase output, cut unit costs and improve your product. Such a survey costs you nothing—and may save you a great deal.

THE OHIO CRANKSHAFT COMPANY

TOCCO

Mail Coupon Today

NEW **FREE** BULLETIN

THE OHIO CRANKSHAFT CO.
Dept. A-7, Cleveland 1, Ohio

Please send copy of "Typical Results of TOCCO Induction Brazing and Soldering."

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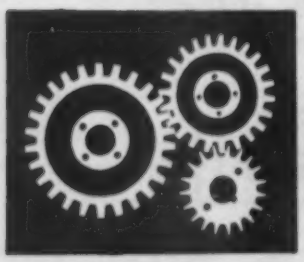
From huge aircraft engines to tiny precision instruments—there's no end to the variety of products improved by Perkins custom-cut Gears!

Perkins is a *gear engineering* organization with a 35 years' tradition of New England craftsmanship as background. As one of the country's largest producers of gears to customers specifications, Perkins will meet your specific requirements for gears—regardless of size, type, material or quantity desired, *and at competitive prices*. You furnish the specifications, we'll produce the gears.

PERKINS MAKES in all materials, metallic or non-metallic, and in any size, to your specifications: helical gears, bevel gears, sprockets, ratchets, worm gears, spur gears with shaved or ground teeth, ground thread worms.

NOTE: The **PERKINS PRECISION SPRING COILER** is the latest development in the spring coiler field and eliminates entirely the use of arbors and long set-up time. It is a complete self-sufficient machine and enables you to make the spring you want *when* you want it — in seconds. The coiler produces any type of spring, in any diameter and any pitch with this range: Wire Sizes .005 to .125. Diameter from 3/32" to 12" and larger. Size of the compact coiler is only 7½ x 16". **A POWER MODEL** mounted on a welded steel console cabinet base is also available. Full information on request.



Perkins Machine & Gear Company

103 CIRCUIT AVENUE
WEST SPRINGFIELD, MASS.

"Specifications required the entire unit be contained in one railroad car . . ."

substantial power output was considered to be the most economical solution. As a result, the Bureau established the general design requirements for a railroad car mounted gas-turbine-driven power plant and Clark Bros. Co. was successful in bidding on the job.

Contained In One Car

Specifications required that the entire unit be contained in one railroad car that could be moved at high speed in any freight or passenger train service without equipment damage.

It also had to be ready to operate within 24 hours after its arrival at a site. Operation on a wide range of liquid and gaseous fuels, in combination or interchangeably, was another important consideration. The only connections were to be to a fuel source and the transmission line. Water supply was not to be required. The gas turbine driven unit developed by Clark meets all of these specifications.

Power Plants Compared

The significant weight and size characteristics of the gas turbine for this service versus other power sources may be appreciated by the following comparison:

Plant Type	Turbo	Steam	Diesel
Rating, KW	7,500	10,000	1,000
Train Length, ft	130	386	60
Track Weight, tons	225	680	70
Specific Weight, lb/kw (dry)	60	75	140
Water Make-up, gpm	0	4	0

The first Turbo-Mobile Power unit has been built by Clark Bros. Co. under contract to the United States Navy. A second unit rated at 6200 kw is being manufactured for The Comision Federal de Electricidad in Mexico. It will be placed in operation next spring.

Other Power Needs

Another important use for the mobile power plants is to meet emergencies which frequently arise from natural causes such as floods, fires, tornadoes, hurricanes, earthquakes, and many others. These

Delivery when promised . . . dependability in every piece . . . and economically produced in stainless steel

on Carlson Order No. 17656

Not every shipment is as diversified as GOC 17656 but it illustrates the typical all-around service in stainless steel available from G. O. Carlson, Inc.

There are plates, heads, rings, circles, flanges, bars and rounds—all stainless steel to chemical industry standards—all made to match the specifications on the customer's blueprint. It took special equipment to make up this order—equipment designed and built by Carlson engineers who work *exclusively* in stainless.

This equipment in the hands of Carlson specialists *lowers* costs. You pay no freight on material you can't use and you save man-hours in easier fit-up, because the material is ready for fabrication when you get it.

When you order your stainless steel from G. O. Carlson, Inc. you can be sure of three things: (1) it is economically produced from the highest quality material; (2) it is cut to your specifications; (3) it is shipped on time. Write *right now* for complete information.

Stainless Steels Exclusively

G. O. CARLSON, INC.

THORNDALE, PENNSYLVANIA

Plates • Plate Products • Forgings • Bars • Sheets (No. 1 Finish)

District Sales Offices in Principal Cities

Don't junk your old boring mill just because it has grown wobbly and loose. Now is the time to have your outdated machine tools returned to their original performance levels through Simmons Engineered Rebuilding—at half the cost of new equipment

Engineered Rebuilding by Simmons *unconditionally guarantees* that your machine tools will equal or exceed manufacturers' original specifications.

And, through modernization, Simmons is adapting old machines to high-speed, high-precision production that was unheard of when the tools were new.

Today: look into the important economies in production, maintenance, and liberal tax allowances available when you turn the old machines in your plant into precision equipment for today's production!

Write, wire, or phone...

Simmons Machine Tool Corp.
1721 N. Broadway, Albany 1, N. Y.

Unconditional guarantee... our standard since 1910

Mobile power units meet many emergency needs . . .

natural disasters often occur suddenly and with devasting results. Power failures can often affect not only the disaster areas, but nearby areas as well. Mobile power plants, strategically located throughout such areas could quickly make power available wherever it is needed.

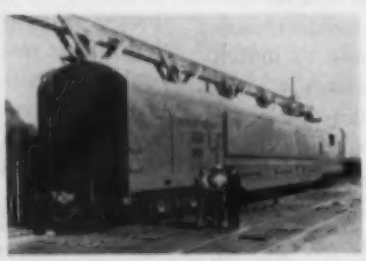
In the event of hostilities, turbo mobile power plants of this type would be well suited to be moved in on ships to base areas. In this country mobile power would be the answer to keeping key manufacturing plants operating in the event of major power failure. The essential facilities of large cities, such as water pumps, hospitals, etc., could also be kept operating.

Solves Distribution Problems

With the new units it is possible to meet the emergency and growth power requirements of fast expanding areas. The trend toward decentralization in our rapidly growing communities can result in a distribution problem, particularly in new areas which are beyond the major power distribution system. The mobile unit will provide immediate power until the load growth warrants an extension of the major system.

The oil, gas and chemical industries have widely accepted centrifugal compressors during the past five years. This has been, in a large measure, due to the availability of a dependable, economical turbine driver.

The steam turbine has been the driver chiefly used in the oil and chemical plants. It can be integrated into the process, making an efficient, flexible driver. It may also



Mobile power plant . . .

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SEE SESSIONS . . . for Metal Specialties, Box & Case Hardware, Stamped Assemblies in a wide range of finishes.

J. H. SESSIONS & SON

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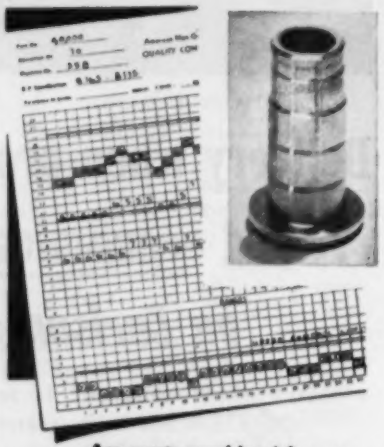

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At Non-Gran, they will be. Our contract machine work, in any metal, is performed under industry's newest approach to better products, at lower cost. Phone, or write, for details—Berwyn 0240.

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AMERICAN NON-GRAN BRONZE CO.
Berwyn, Pa.
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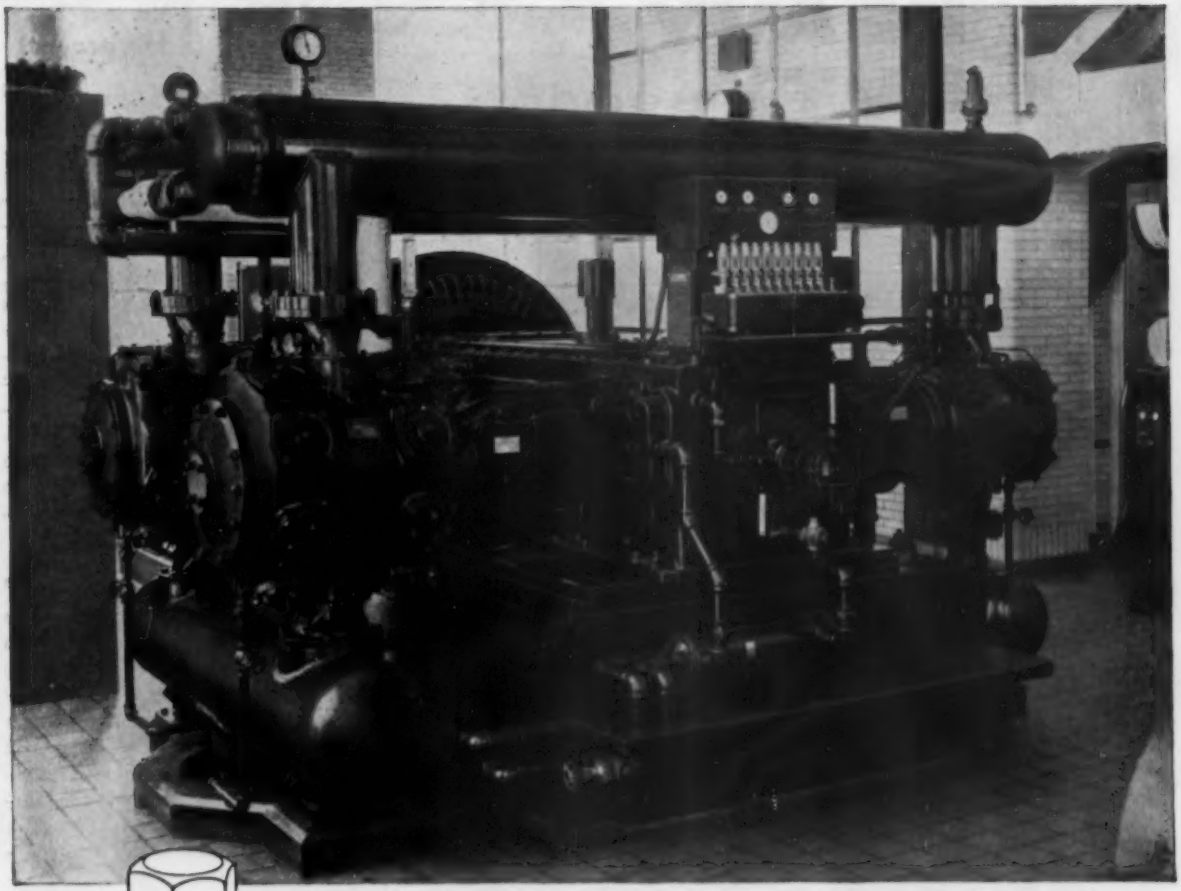
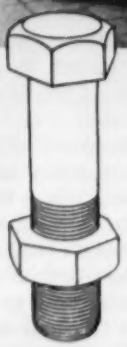
Write for folder "Better Production Control."





JUST BOLT IT TO THE FLOOR

that's all Ford had to do

Expanding operations at Ford Motor Company's assembly plant in Buffalo, N. Y. demanded additional shop air capacity. It had to be installed quickly and, if possible, without disruption to existing facilities.

Inasmuch as the installation was to be on the second floor of the power house, Ford engineers selected a Clark CMA-4, 350 horsepower, Balanced/Opposed Compressor. The low installation cost was an important factor.

With the Clark motor-driven unit, it was unnecessary to run foundations all the way down to the basement. Piping, which was beneath the proposed compressor location, did not have to be moved.

Because of the perfect balance of the Clark unit, it was possible to mount the motor and compressor on a steel sub-base which was bolted to floor I-beams. No foundations were required. No pipes were relocated.

. . . nor was there any lost production. The Clark unit was tied in over a weekend.

The Buffalo assembly plant is but one of many Clark Compressor installations serving the Ford Motor Company's vast operations.

Before you consider any proposed compressor location *impossible*, it may save you money to talk it over with your nearest Clark representative. In the meanwhile, make sure you have Bulletin 118 in your files. Write today.

CLARK BROS. CO. • OLEAN, N. Y.

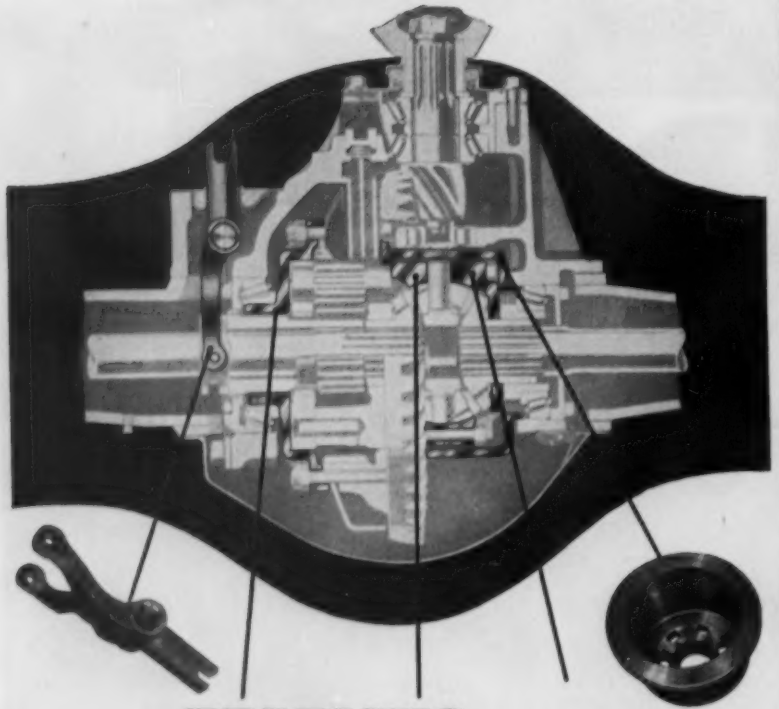
"One of the Dresser Industries"

Sales Offices in Principal Cities Throughout the World

PRECISION BY THE TON **CLARK** **balanced/opposed compressors**

150-4500 HP

for **HEAVY DUTY** service



PEARLITIC MALLEABLE CASTINGS

The 2-speed truck axle is a *must* under varying load and road conditions because it provides a tailor-made ratio for every condition. But it takes a severe beating under heavy duty conditions encountered in logging, mining, farming, etc.

That's why Eaton Manufacturing Company, leading producer of 2-speed axles, specifies pearlitic malleable — from National — for several vital parts. For Eaton knows that pearlitic malleable has high ultimate strength . . . resists wear under heavy loads at high speeds . . . possesses excellent non-seizing properties. In addition, pearlitic malleable can be given a smooth finish . . . can be either liquid or air quenched. And perhaps *most important of all, pearlitic malleable machinability index ranges from 80 to 90* (B1112 steel = 100).

Look your product over critically. Pearlitic malleable castings—from National—can replace costlier fabrication methods . . . can offer opportunities of reduction in weight, machining and assembly time. AA-1197

Photos: Courtesy Eaton Manufacturing Company

NATIONAL MALLEABLE AND STEEL CASTINGS COMPANY

Cleveland 6, Ohio

The Nation's largest independent producer of malleable and pearlitic malleable

Integrated in the process plant setup, the unit makes an efficient driver . . .

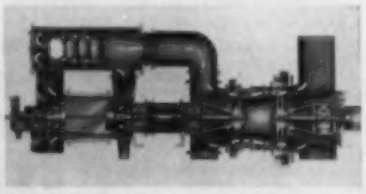
be matched to the individual compressor horsepower and speed requirements at a reasonable cost. This situation is not, however, true on gas transmission lines where there are no process requirements and water is generally difficult to secure. While steam turbines have been used on gas transmission pipe lines to drive centrifugal compressors, they have posed operating problems because of water and maintenance requirements.

Process Industry Use

The gas turbine does not require water. Therefore, this objection to a gas turbine on a gas transmission line is eliminated. A number of gas turbines are being proven in this service today. The successful operation of these plants undoubtedly heralds the use of gas turbines in the process industries also.

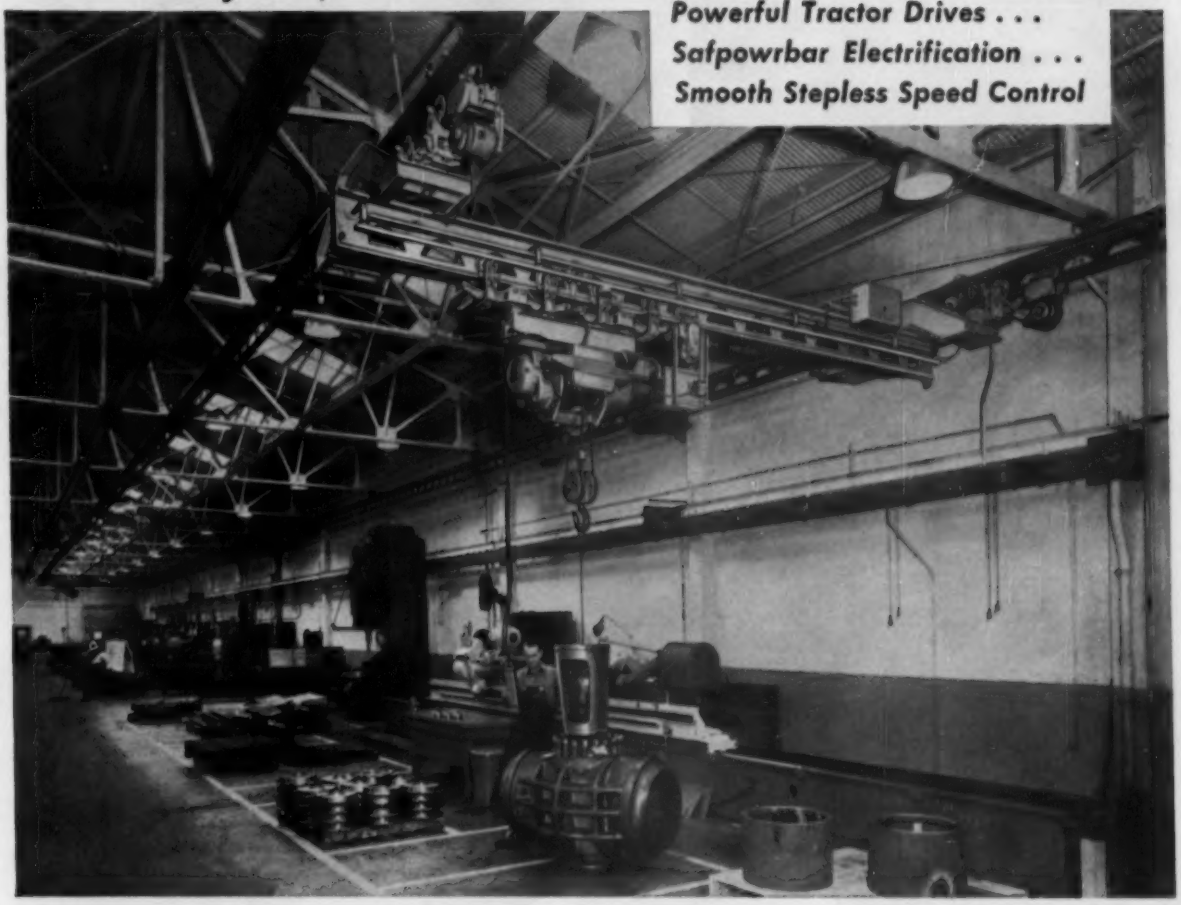
The gas turbine as presently conceived lacks the range of horsepower ratings for the diversified requirements of the process industry. Fortunately, pipe line stations involve large blocks of power. The available gas turbine rating is divided into this power figure in order to secure the number of duplicate machines needed. The compressor builder is then required to design a compressor to match the needs of the transmission line and the driver manufacturer.

The process industries can not do this. The greater complexity of the multi-stage compressor requirements and plain economics dictate another answer. For these industries a special turbine operating at low temperatures and stresses is recommended.



Turbine cross-section . . .

A *Mighty Fine* 5 TON CRANE



Powerful Tractor Drives . . .
Safpowrbar Electrification . . .
Smooth Stepless Speed Control

HERE IS a modern 5 ton crane that offers you the finest in performance. Completely motorized, this 22'-0" long heavy-duty crane is floor-operated with all motions controlled by the pendant push-button station.

Rugged four-wheel tractor units propel both the bridge and the carrier; two units on the bridge and one on the carrier. The tractors not only have tremendous draw-bar pull for their size, but are easy to inspect and maintain. If ever necessary, a tractor can be quickly uncoupled and replaced by a spare.

Reactor type single-speed control provides unusually smooth acceleration for bridge and carrier drives which have travel speeds of 125 fpm.

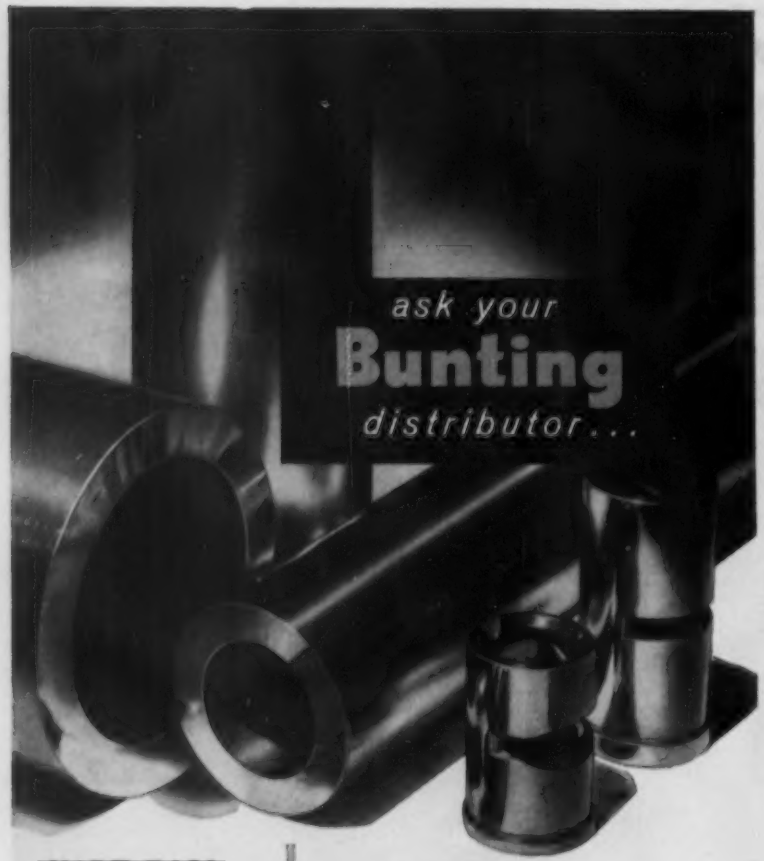
Safety-conscious people will find Cleveland Tramrail Safpowrbar electrification on the crane and runway of tremendous advantage. It protects against serious injuries from accidental contact, and of additional interest, the sliding collector shoes have approximately five times the life of collector wheels.

This crane is only one of dozens of types and sizes Cleveland Tramrail has available. So whatever your needs, you can be sure that Cleveland Tramrail is in a position to serve you.

GET THIS BOOK!
BOOKLET No. 2008. Packed with valuable information. Profusely illustrated. Write for free copy

CLEVELAND TRAMRAIL DIVISION
THE CLEVELAND CRANE & ENGINEERING CO.
4806 EAST 290th STREET, WICKLIFFE, OHIO

CLEVELAND TRAMRAIL
OVERHEAD MATERIALS HANDLING EQUIPMENT



JUST DIAL HIS NUMBER

Your Bunting Distributor carries in stock for your money saving convenience completely machined and finished Bunting Standard Stock Industrial Bearings, Electric Motor Bearings and Precision Bronze Bars in a complete range of sizes, meeting all your usual production and maintenance needs. You will find him listed in the classified section of your telephone book—most likely under the heading Bars, Bronze or Bearings, Bronze. Your Bunting Distributor is an industrial distributor or a specialist in certain industrial items. He has been especially selected for his responsibility and his understanding of bearing requirements. Ask him for the Bunting Catalog or write.

. . . for this speedy cost-saving bearing service

The local availability of Bunting completely machined and finished bronze bearings and bars is saving money, time and trouble in machinery maintenance everywhere in America. Stocks of Bunting Bronze Bearings and Bars constantly carried by Bunting Distributors are adequate to supply the needs of the whole nation for an indefinite time.

DISTRIBUTOR

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BRONZE BEARINGS • BUSHINGS • PRECISION BRONZE BARS

THE BUNTING BRASS AND BRONZE COMPANY, TOLEDO 1, OHIO
BRANCHES IN PRINCIPAL CITIES

Machining:

Automotive stem pinions turned in tracer lathe.

A combination of hydraulic tracer turning and auxiliary tooling on a rear slide now enables automotive stem pinions to be completely machined in a single tracer lathe. The machine, built by Hydra-Feed Machine Tool Corp., Ferndale, Mich., pioneers a new step in production turning of these key auto parts.

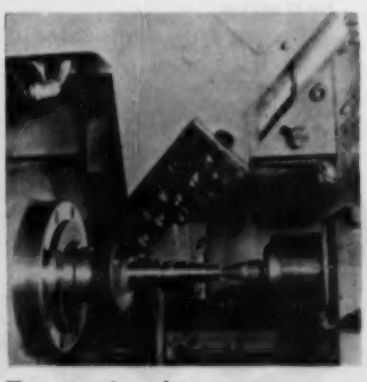
The part, an SAE 4620 forging, is machined at a spindle speed of 1046 rpm and 0.027 in. feed. Turning is done dry or with coolant depending on the machining preference at the several installations.

In A Single Chucking

In order to do the job in a single chucking, including turning the head, carbide driving inserts are used on the spindle and eliminate the need for any chucking arrangement that would interfere with taking this cut. The use of face drive inserts was introduced to industry by Hydra-Feed several years ago and is now an accepted method of performing turning operations close to the spindle.

Nearly 2 lb of metal are removed from each forging during this one setup operation. The rear carriage with its special tooling turns the thread diameter and the head while the tracer turns the stem.

Despite the high rate of metal removal, exceptional tool life has resulted for the standard diamond-shaped carbide tools used. This



Tracer turning . . .

"To the success of your mechanism"
WALLACE BARNES COMPANY
BRISTOL, CONNECTICUT
THE WILLIAM D. GIBSON COMPANY
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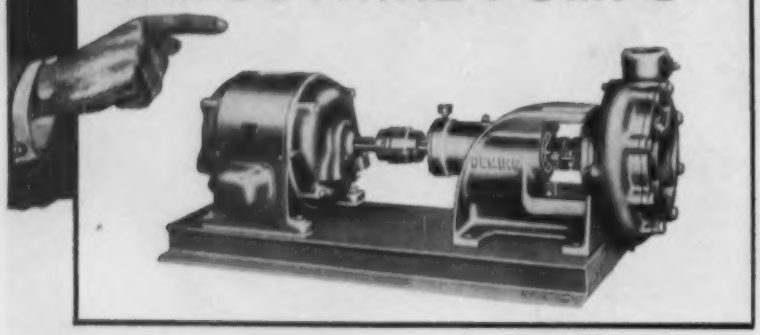
HAMILTON CANADA

The more you need pumps, the more you need...

DEMING
INDUSTRIAL PUMPS



here's an example: Optional features of the Deming Fig. 4011 Centrifugal Pump (shown above) extend its scope of uses to handling a wide variety of different kinds of liquids . . . corrosive or non-corrosive. In many cases, this versatile pump eliminates the need for higher-cost pumps built entirely of corrosion-resistant metals. Other optional features include a choice of impellers and either stuffing box, or mechanical seal construction. BULLETIN No. 4011 explains this popular Deming Pump. Send for copy.

NOTE THE SCOPE OF THE DEMING LINE

- Small side suction Centrifugal Pumps
- Centrifugal Pumps with separate liquid end
- "Motor-Mount" Centrifugal Pumps
- Split case Centrifugal Pumps
- Self-priming Centrifugal Pumps
- High pressure Multi-Stage Pumps
- "Oil-Rite" Duplex and Triplex Pumps
- Condensation Return Units
- Vertical Turbine Pumps
- Vertical Sump Pumps
- Vertical Sewage Pumps
- Submersible Pumps

A Deming Distributor is near you for prompt service

75th ANNIVERSARY DEMING PUMPS 1880 - 1955

THE DEMING COMPANY
566 BROADWAY • SALEM, OHIO

advantage results largely from the rigidity inherent in the massive construction and the downward tool pressures that are features of the machine's design.

Although metal is removed in large volume, chips do not interfere with maximum operating efficiency. Since the slide and the template are both located on the top carriage, chips drop into the chute without lodging on vital machine components.

Welding:

Insulation material helps reduce downtime.

Costly "shorts" (shorting out of equipment) that plague the electric spot welder and result in poor welds, work stoppages and part rejects have reportedly been greatly reduced by the introduction of an entirely new kind of plastic insulation for welding equipment.

Application of the new insulator to welding points, point holders and other trouble spots—where metal being welded is apt to come in contact with the equipment—results in a smooth, non-peeling, plastic surface of cement-like hardness that is not brittle and does not conduct electricity.

The plastic insulator adheres equally well to flat or round surfaces, to metal, plastic and other surfaces. In maximum durability tests at Detroit auto plants where it is now in use, the insulation was subjected to intense heat, considerable rubbing and hitting. It is reported to have outlasted conventional methods of insulation by an average of 14 to 1. Easy to apply, maximum application takes about seven minutes.

Fewer shorts . . .

(Advertisement)

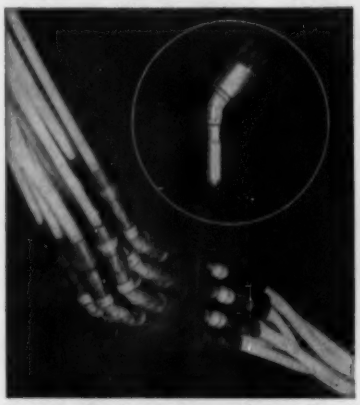
BRIDGEPORT BRASS COMPANY

COPPER ALLOY BULLETIN

Bridgeport BRASS CO.

Reporting new developments in copper-base alloys and metalworking methods.

Bridgeport Alloys and Technical Service Help Produce High-Quality Electrical Connectors



Subject to bending during manufacture, Burndy selected Bridgeport Alloy 3089 to prevent fracture at the elbow of this aircraft connector.

In any electrical system, complex or simple, good connectors are as vital as good conductors. Connectors must often meet severe operating conditions and in some installations, must resist corrosion as well as provide strength to the wiring system.

One of the leading manufacturers of connectors is Burndy Engineering Co. of Norwalk, Conn., producers of connectors for electrical systems ranging in size from 12-inch bus bar connectors to connectors for delicate and complex electronic equipment. More than a billion Burndy connectors are now in use.

In making sure connectors are the strongest links in every electrical system they serve, Burndy subjects connectors to rigorous testing.

Burndy connectors undergo tough mechanical and chemical tests before being put into use. In many cases, they must exceed conductors in conductivity in addition to having maximum tensile strength.

To insure top quality, Burndy compression connectors are made from Bridgeport Oxygen-Free Copper Alloy 103. These are crimped at one end to take a conductor cable, and are often flattened and punched for a bolt hole at the other end.

For connectors requiring greater mechanical strength, Burndy specifies Bridgeport Silicon Bronze 609. This high-strength alloy, as tough as mild steel, has exceptional resistance to corrosion and stress cracking. The remarkable cold-working properties of Bridgeport 609 make it an ideal choice for the many severe forming operations encountered during manufacture.

For the small offset connector shown at left, Burndy turned to Bridgeport Alloy 3089 because this alloy can undergo bending without cracking or checking. Alloy 3089 also has good corrosion resistance, and is particularly adaptable to the manufacture of wire and cable connectors as well as hardware fittings.

Product quality isn't just a matter of materials, or of planning, design or specifications. Quality starts with cooperation between the manufacturer of finished products and the suppliers of raw materials.

A typical Burndy "Hylug" connector made from Bridgeport Oxygen-Free Copper Alloy 103.

That's what happened in this case—Burndy and Bridgeport maintain close technical liasion to develop and establish high quality standards for the finished product. When new requirements materialize, new specifications are written—and met. There's a mutual interest in, and responsibility for doing a thorough job.

This close cooperation with manufacturers is only one of the advantages of Bridgeport's Technical Service. This service is available to you without cost. If you are looking for product quality, product improvement and ways of increasing your metal-working profits, call your nearest Bridgeport Sales Office and ask for Technical Service. They'll be glad to lend their assistance to your operations.

Precision Diode Clips & Taper Pins Accurately Machined from Bridgeport Alloy 6

Lerco Division of Lynn-Deatrick, Inc., of Burbank, Calif., is machining—automatically—three clips for crystal diodes and four taper pin terminals, all for use in electronic equipment. One clip is for front-panel mounting. A second is also for front-panel mounting, but contains a blind hole for dip solder. The third clip serves rear-of-panel connections.

The four terminals are a double-end taper, front tapered and back tapered terminals and a front taper terminal with blind hole.

These tiny parts, small but vital to electronic systems, must retain a firm grip on crystal diodes even after multiple insertions. The tapers must be held to close tolerances for consistently accurate fits. The parts themselves must be strong, precise and economical to manufacture.

Lerco uses Bridgeport No. 6 Alloy for these parts with excellent results. The uniform size of Bridgeport No. 6 eliminates fit and tolerance problems. Its consistent high quality assures easy machining to exact dimensions.

Although Lerco's requirements for Bridgeport No. 6 are unique and exacting, No. 6 Rod can satisfy specifications for more than 90% of the jobs requiring free-cutting brass rod.

If you have a product that requires Bridgeport No. 6 Rod, or any other Bridgeport Alloy, consult your local Bridgeport office for information and help. They'll be glad to apply their metal-working knowledge and experience to solving your specific problems.

(3757)

Bridgeport BRASS CO.

BRIDGEPORT BRASS
COMPANY ♦ BRIDGEPORT, CONNECTICUT

Mills at Bridgeport, Conn., Indianapolis, Ind., and Adrian, Mich. Sales Offices in Principal Cities—Conveniently Located Warehouses

QUALITY CONTROL FOR MASS PRODUCTION. Days have been chopped to minutes by the installation of such equipment as this direct-reading spectrometer which can analyze beryllium copper alloys while they are still molten.

NEW MANUFACTURING FACILITIES INCREASE PRODUCTION, IMPROVE QUALITY OF "BERYLCO" BERYLLIUM COPPER

The production of beryllium copper, that uniquely versatile alloy which does so many jobs so well, has always been a complicated process. Beryl ore must be processed chemically to produce beryllium oxide. Master alloy is obtained by subjecting beryllium oxide, copper powder, and carbon to high temperatures in electric arc furnaces. Subsequent operations include ingot casting, soaking, annealing, pickling, hot and cold rolling, and drawing.

New technological advances—represented by a multimillion-dollar new investment in plant and equipment by The Beryllium Corporation—have successfully adapted basic quality control to large-scale production. Users of "Berylco" will reap the benefits. The spectrometer shown above, for instance, enables very close chemical control to be exercised in the production of the various beryllium copper alloys. New rolling mills produce strip to closer tolerances while enhancing over-all quality. These and other new tools produce sizes and forms not previously available —and in many cases have achieved economies which have already been passed on to users.

Write for engineering help or sample testing material.

ORE GRINDING MILL—a part of the fully integrated "Berylco" facilities.

NEW COLD-ROLLING STRIP MILL finishes beryllium copper to close tolerances.

BERYLCO®

THE BERYLLIUM CORPORATION

DEPT. 5G, READING 6, PA.

STOCKED BY WAREHOUSE DISTRIBUTORS THE COUNTRY OVER

Methods:

Use honeycomb to obtain porcelain panel flatness.

Panel flatness, difficult to attain yet highly desirable where large areas of porcelain enamel are used, has been achieved by one company through an ingenious use of ¼ in. aluminum honeycomb.

In the design of the insulated Porcelpanels for exterior facing of the Ford Central Staff Office Building in Dearborn, Mich., Ingram-Richardson Mfg. Co. included a sheet of ¼ in. hex aluminum honeycomb to assure flatness of the surface. The panels will cover a 90,000 sq ft area.

Flat Within A Sixteenth

Here, on one of the largest uses of porcelain enamel made in a single structure, panel flatness was particularly important. With so much area of the material being used, any tendency to waviness in the panels had to be eliminated. The use of the honeycomb, together with a galvanized backing sheet and a rigid insulation, allowed Ing-Rich to assure flatness within 1/16th in. over a 15 sq ft area.

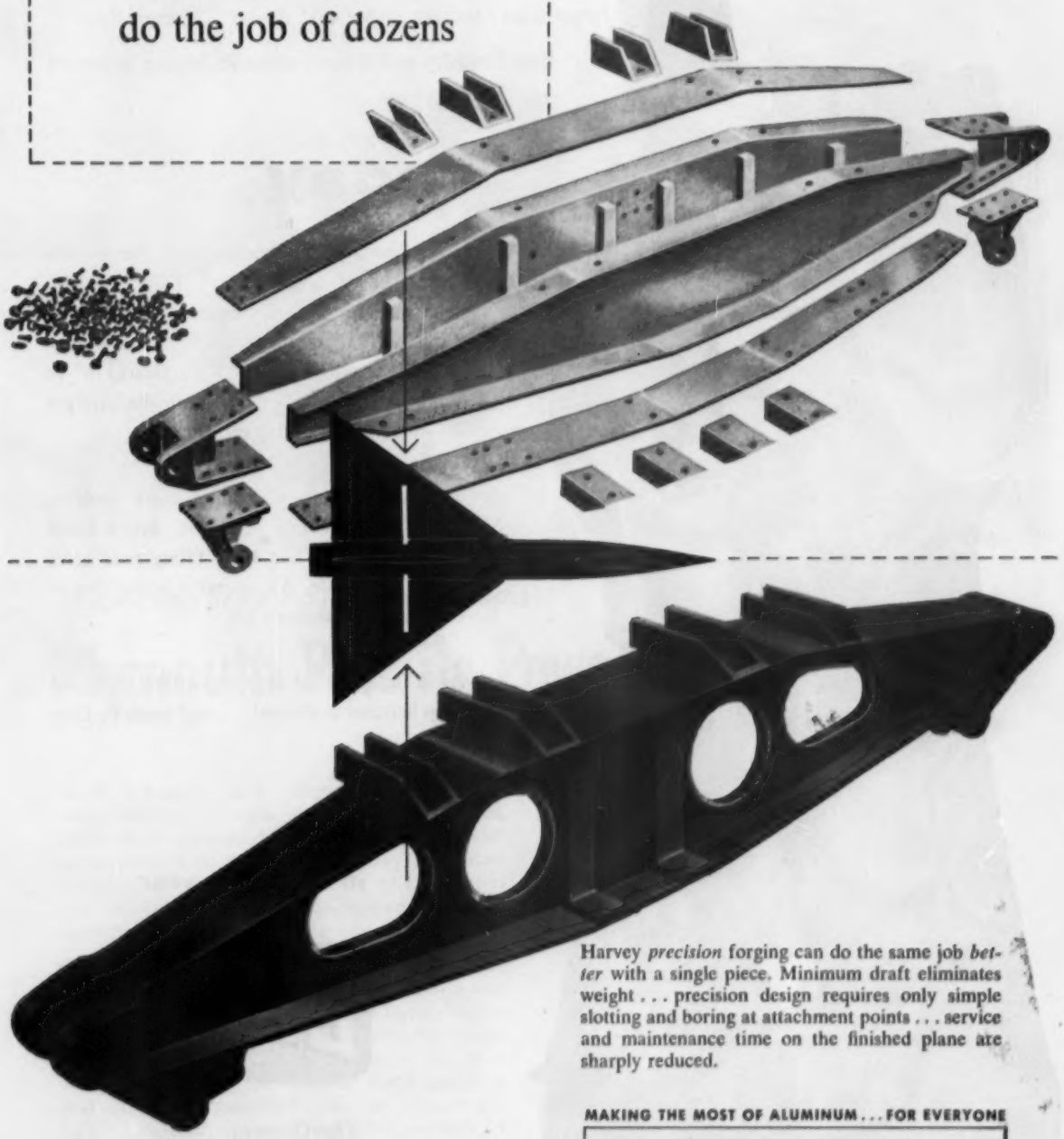
More than 6500 individual panels are being produced for the Ford building. Each panel is composed of these elements: a front face of steel, porcelain enameled on both sides; ¼ in. thick aluminum honeycomb; 24 gage galvanized steel backing sheet; 2 in. of Foamglas insulation; and a back pan of painted galvanized steel.

The panel components are laminated together and total thickness is only about 2½ in.

Honeycomb for flatness . . .

Harvey precision forgings... making one part do the job of dozens

Here's an aircraft beam . . . made the old way. Each one of the pieces you see must be handled separately, brought to an assembly area, laboriously put together with upwards of 40 bolts, almost 200 rivets. And it's only one of many similar beams in a typical modern plane.



Harvey *precision* forging can do the same job *better* with a single piece. Minimum draft eliminates weight . . . precision design requires only simple slotting and boring at attachment points . . . service and maintenance time on the finished plane are sharply reduced.

MAKING THE MOST OF ALUMINUM . . . FOR EVERYONE

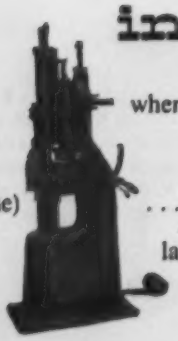
HARVEY Aluminum

RESEARCH . . . DEVELOPMENT . . . PRODUCTION

Harvey does all three as a leading independent producer of aluminum extrusions in all alloys and all sizes, special extrusions, press forgings, hollow sections, structurals, rod and bar, forging stock, pipe, tubes, impact extrusions, aluminum screw machine products and related products. Also similar products in alloy steel and titanium on application.

HARVEY ALUMINUM SALES, INC., TORRANCE, CALIFORNIA—BRANCH OFFICES IN PRINCIPAL CITIES

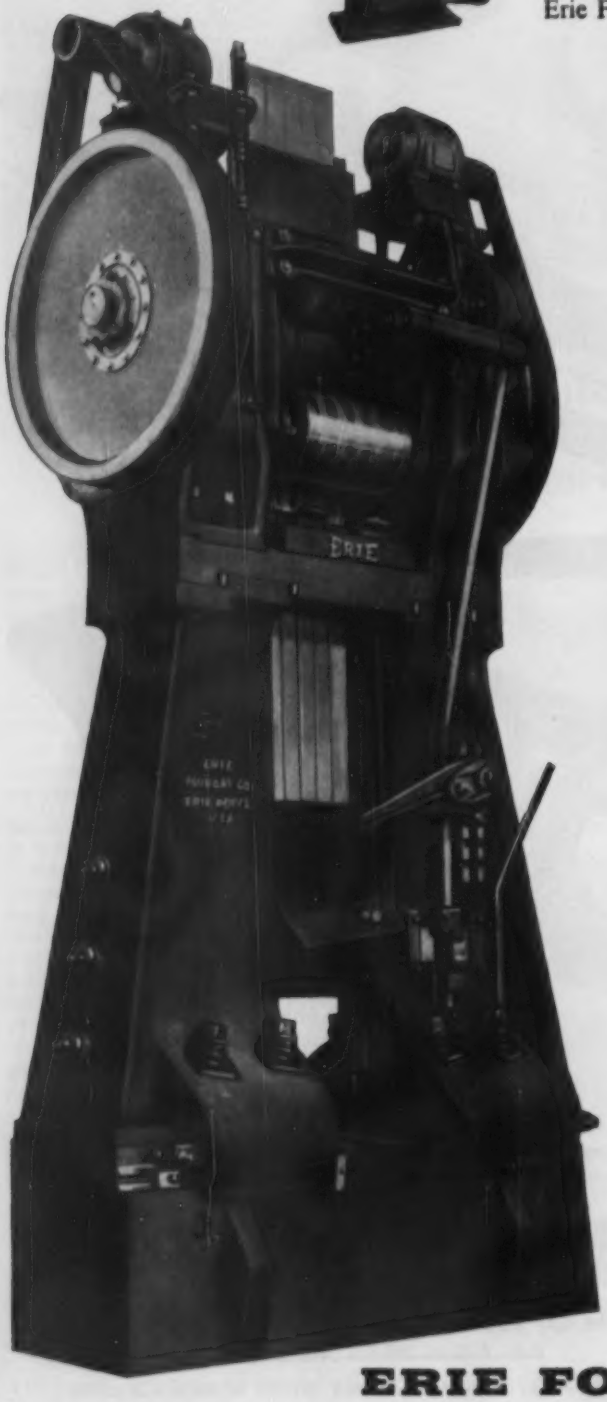
in the good old days



(such as this 100 lb. single frame)

when Erie Foundry was *the first* to use all-steel construction in all our hammers

. . . . . and when hammermen thought a board drop hammer larger than 5,000 lbs. was a wild dream . . . . even then Erie Foundry was a great name in forging hammers



today

Erie Foundry has recently built the world's largest board drop hammer. This 10,000 lb. hammer is at work for Eaton Manufacturing Co's Marion, Ohio forge plant. Eaton is forging 68 lb. net, Flat Back Ring Gears, 16" in diameter, in a single impression die, straight down without blocking or pancaking.

In addition to forging large gears speedily, Eaton likes the Erie 10,000 lb. Board Drop Hammer because the 4-roll lifting head gives longer board life. Air operated board clamps ease the hammerman's job.

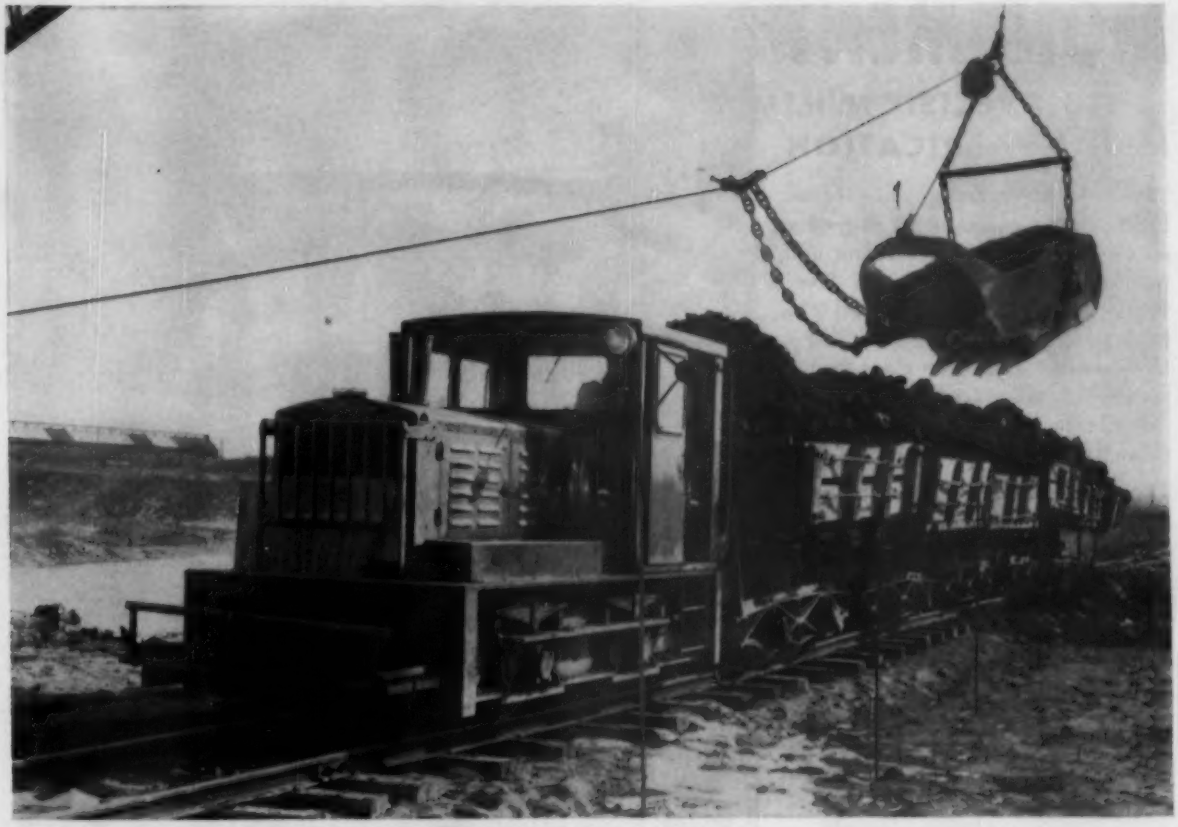
As in the good old days, this 10,000 lb. board drop hammer is all-steel . . . and made by Erie.

in our 60th year

ERIE

The Greatest Name in Forging Hammers

ERIE FOUNDRY CO. ERIE, PA.



AT CHICAGO BRICK CO., DALTON, ILLINOIS

Plymouth Puts its Power on the Payload

WITH ASSIST FROM TORQUE-CONVERTER COUPLING

"Our operation is a common one, and not very dramatic," says Mr. Robert Coleman, Plant Superintendent. "All we require of our locomotive is to be on the job day after day hauling 650 to 700 cubic yards of clay from pits to ovens and do it economically without downtime and maintenance costs."

"And our Plymouth fills this big bill. It operates economically and puts its power on the payload, where it counts. The Torqomotive Drive and the Fuller torque-converter coupling transmit Plymouth's power to the load without spinning the wheels, make starting and stopping smoother, let the Plymouth "dig" into the job with just the amount of power needed to move the load. It's easy to operate, and we haven't had a bit of trouble with it. We don't waste any power at Chicago Brick now!"

You could be wasting power, adding needless costs to your operation. Find out how a Plymouth can smooth out your operation, cut costs. Models from 3 to 70 tons. Gasoline or Diesel, mechanical or Torqomotive Drive.* Also Diesel-Electrics. Send a brief outline of your requirements for free analysis by F-R-H engineers — no obligation on your part, of course. ADDRESS: PLYMOUTH LOCOMOTIVE WORKS, Division of THE FATE-ROOT-HEATH COMPANY, Dept. A-2, Plymouth, Ohio.

PLYMOUTH® TORQOMOTIVES

*TORQOMOTIVE DRIVE: Plymouth Transmission coupled to a Hydraulic Torque-Converter

ALSO BUILDERS OF F-R-H CERAMIC MACHINERY

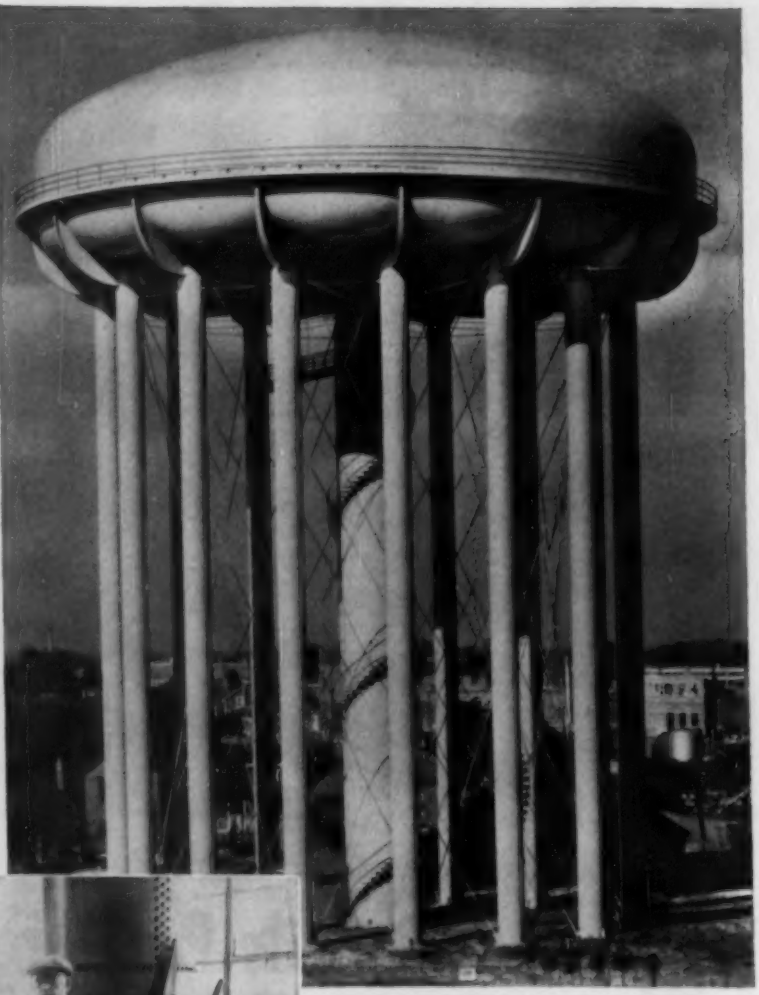
MONUMENT

TO PRECISION METAL FABRICATION

This 104-ft. diameter radial cone bottom elevated tank is indeed a monument to the engineering and fabricating ability of Horton Steel Works, Ltd., Fort Erie, Ontario. The huge structural members, including a framework of angle-iron rings for the tank roof, were precut and formed in the Horton shops to fractional-inch tolerances for on-site assembly.

The rings, which are welded to the underside of the roof plate, were accurately and rapidly shaped to the curve of the roof by "Buffalo" Bending Rolls like the one shown below. Horton uses one of these machines in its Fort Erie plant to form the curved angles used in Horton tanks.

If you bend structurals, do it the accurate, high-speed way used by industrial leaders — with "Buffalo" Bending Rolls.



"Buffalo" BENDING ROLLS

— like this No. 3 Horizontal Roll at the Horton plant, turn out commercially perfect circles, spirals, arcs and other shapes from most structurals, at production-line speeds. A full range of "Buffalo" Horizontal and Vertical Bending Rolls is available for your heavy structural forming — while "Buffalo" Pinch-Type and OA Aircraft Type Rolls are ready to cut your costs on bending light members. Write today for Bulletins 3344-A and 352-C.

ESTABLISHED 1877 "Buffalo" MEMBER N.M.T.B.A.

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492 BROADWAY BUFFALO, NEW YORK

Canadian Blower & Forge Co., Ltd., Kitchener, Ont.

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The new Sandvik building provides modern, expanded facilities for the *administrative, production* and *Eastern Warehouse* operations of the main company and all divisions, including:

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Carbide Tipped Tools, Blanks and Inserts, Milling and Combination Cutters.

SANDSTEEL SPRING
Power springs for watches, instruments, office machines and other industrial uses.

SANDVIK STEEL BELT CONVEYORS
Cold rolled Carbon and Stainless Steel Belt Conveyors for Material Handling and Processing.

SANDVIK SAW & TOOL
High Quality Swedish Hardware, Tools and Specialties.

Works: Sandviken, Sweden • Hallefors, Sweden

Sandvik Quality Steels

SS-107

For applications which require HIGH FATIGUE LIFE, FINE SURFACE FINISH, ACCURATE & UNIFORM GAUGE specify SANDVIK cold rolled specialty strip steels.

You can get Sandvik strip steels:

- **In special analyses for specific applications.**
- **Precision-rolled in thicknesses to fit your requirements.**
- **In straight carbon and alloy grades.**
- **Annealed, unannealed or hardened and tempered.**
- **Polished bright, yellow or blue.**
- **With square, round or dressed edges.**
- **Wide range of sizes in stock—**
  —or slit to your specifications

Ask your nearest Sandvik office for further information or technical assistance.

Sandvik Swedish Specialty Strip Steels are used for Textile Machine Parts such as sinkers, needles, etc. • Band Saws (metal, wood and butcher) • Camera Shutters • Clock and Watch Springs • Compressor Valves • Doctor Blades • Feeler Gauges • Knives such as cigarette knives, surgical, etc. • Razor Blades • Shock Absorbers • A Wide Variety of Springs • Trowels • Reeds: Vibrator, Textile, etc. • Piston Ring Segment and Expanders • and many other applications.

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DISSTON STAINLESS STEEL

...hot rolled to SHAPE

saves steel · tooling · machining

Stainless steel users receive many advantages by ordering Disston steel shapes accurately rolled to their specifications.

LESS MACHINING. Tool operations are simplified, for Disston shapes are rolled to precision tolerances, have exceptionally fine finishes.

REDUCTION IN WASTE MATERIAL. Preshaped Disston steel reduces scrap losses. One well-known manufacturer saved 47% of stainless steel tonnage by starting with a rolled Disston shape—instead of a rectangular section.

LOW-COST HANDLING OF SMALL ORDERS. Jobs as little as five or ten tons on a particular shape are rolled easily, economically in the Disston mills. Over 100 years of leadership in the rolling of special shapes gives Disston the edge in metal-shaping skill and technique.

Why not talk over your requirements with a Disston representative? Learn how much you can save by using Disston stainless steel shapes. Or write to:

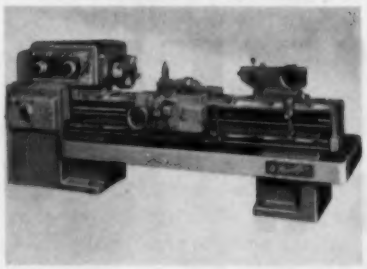
Henry Disston & Sons, Inc., Steel Sales Division
719 Tacony, Philadelphia 35, Pa., U.S.A.

DISSTON HAS THE EDGE®
in special purpose steels
and special steel shapes.

100 YEARS OF FINE STEEL MAKING

NEW EQUIPMENT

New and improved production ideas, equipment, services and methods described here offer production economies... for more data use the free postcard on page 113 or 114



Featured as new from headstock to tailstock

New Powerturn lathes have a computing head which merely requires the setting of two dials and correct settings for the three speed shifting levers are instantly indicated. All controls and control handles have been regrouped for convenience and shaped for fumble-free operation. A built-in hp ammeter indicates amount of lathe's capacity being utilized. A 16-in. Toolmaker model at the Machine Tool Show will be in operation chasing a lead screw to precision tolerance. *Lodge & Shipley Co.*

For more data circle No. 31 on postcard, p. 113.

Shear operates on pivoted-blade principle

Steelweld pivoted-blade shear to be exhibited at the Machine Tool Show will cut mild steel up to 12 ft x ½ in. The blade will travel in a circular path without the use of guides and slides, eliminating a principal source of wear and shearing inaccuracies. Features include a fatigue-reducing electric foot switch; a cool running air-operated clutch and brake which is fast and positive acting; and micro-set knife adjustment that makes it a simple, quick task to adjust knife clearance to suit thickness of metal being cut. *Steelweld Machinery Div., Cleveland Crane & Engineering Co.*

For more data circle No. 32 on postcard, p. 113.

Screw slotter rated at 720 screws per minute

New machine automatically slots, deburrs and delivers up to 720 screws per min. Innumerable innovations and features contribute to its ease of operation, speed and economy. Entire range of the machine is covered by one work carrier wheel which permits change-overs to be made in minutes. New removable hopper which is completely jam-proof speeds work to the saw. All-electronic drives permit work carrier and saw to have four easily set speeds. A wide range of screws may be slotted. Other features include the automatic deburring device, frictionless bearings and a large coolant tank equipped with a motorized pumping unit. *Roy Machinery & Sales, Inc.*

For more data circle No. 33 on postcard, p. 113.

Structural steel member for small industrial units

A lightweight standard steel joist has been developed for supporting floors and roofs of small industrial units and other light occupancy buildings. Coils of heavy steel strip and round bars are formed and welded to produce the new joists. First, the flat steel is cold rolled into special U-shaped sections. Then the bars, bent into a zig-zag shape, are resistance welded between upper and lower sections. Joists are fabricated 3 to 40 ft long and in various widths and weights to suit the customer. *American Bridge Div., U. S. Steel Corp.*

For more data circle No. 34 on postcard, p. 113.

Turn Page

Hats off...

to LUSTERIZED*

TRADE-MARK

FINISH

"LUSTERIZED FINISH needs no further surface preparation for our use."

"An outstanding development in the industry."

"We're no longer burnishing."

"We have eliminated a grinding operation."

"Your flats look plated."

"Our hats off to your research departments."

Here's what they are saying about this NEW

COLD DRAWN FINISH

Today, It's Industry's most wanted BAR STEEL!

NON-LUSTERIZED

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Send in Your Order TODAY

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COLD FINISHED CARBON AND ALLOY STEEL BARS

BLISS & LAUGHLIN, INC.

GENERAL OFFICES: HARVEY, ILLINOIS

SALES OFFICES IN ALL PRINCIPAL CITIES

FOUR PLANTS:—

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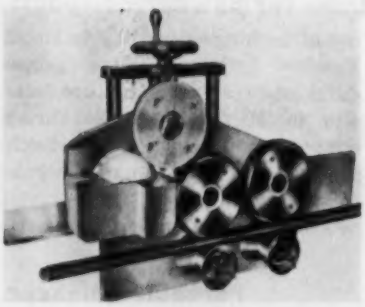


Permits continuous printing of tubes and bars

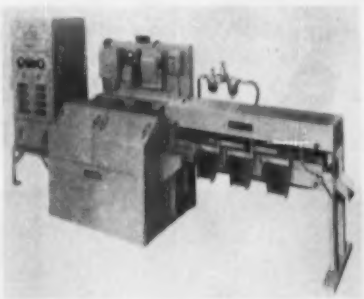
New automatic printer is being introduced in relation to the plan for military marking requirements in the ferrous and nonferrous industries. It utilizes the offset principle in a simple mechanism. Maintenance has been eliminated except for the cleaning of one roll and the type faces during periods when the unit has not been operated for some time. The machine can be operated by anyone either in a moving production line, or as a motorized unit for a separate printing operation. One simple adjustment permits printing on various diameters and relatively large size characters on small diameter surfaces. *Jas. H. Matthews & Co.*

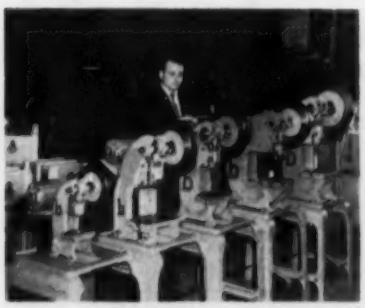
For more data circle No. 35 on postcard, p. 113.

Checkweighing machine for connecting rods

An automatic weight classification machine for weighing connecting rods for reciprocating type engines has been designed for direct insertion into a powered conveyor type production line. The checkweigher weighs and sorts connecting rods automatically into eight weight classifications: one for underweight, one for overweight; and six for correct weight within the established range for each grade of connecting rod. The Selectrol receives the rods from a conveyor belt and intermittent drive-power feed mechanism loads and unloads the scale. Machine accommodates a 585 gram weight rod. *Exact Weight Scale Co.*

For more data circle No. 36 on postcard, p. 113.





Increased tonnage on new punch press line

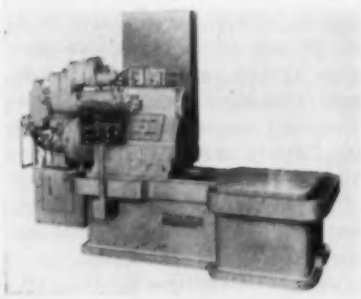
A series of five new punch press models feature increased tonnage through redesigning. Two full tons are now delivered by the former 1-ton press. The 4-ton Benchmasters have a 5-ton capacity; the 7½-ton delivers 8 tons. The presses are available in standard OBI inclinable types, a deep throat model, back-geared models and half-presses. Latest improvements include a new oversize clutch design. The sliding key is contained in a large steel collar taking the entire load off the crankshaft keyway. Brake size has been increased, with ram stopping on top dead-center after each stroke. *Benchmaster Mfg. Co.*

For more data circle No. 37 on postcard, p. 113.

Drum for taconite pelletizing process

This 9-ft diam x 30 ft long 37-ton balling drum is one of 18 units being used by a Minnesota taconite pelletizing and heat hardening plant. The drums convert finely ground taconite concentrates to ½-in. diam balls, a form suitable for hardening. Each drum has capacity of 30 to 45 tons of concentrates per hour. Shell of the drum is lined with expanded metal and 1 in. of concrete. Moisture content of concentrate, additives and slope and speed of the drum control ball formation. *Allis-Chalmers Mfg. Co.*

For more data circle No. 38 on postcard, p. 113.

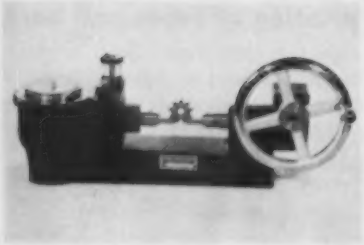


Fixed center boring mill for short run production

Versatile fixed center horizontal boring machine furnishes tool room accuracy at production rates. Machine table is arranged to take fixtures which would locate for height and position the pieces to be bored. Operation is by pushbutton with pre-set automatic cycle, or manual with separate pushbuttons on panel for rapid advance, coarse feed, fine feed, dwell, and rapid return. In pre-set automatic cycle, the speeds, feeds and stroke can be varied to suit requirements of part. Single units or a complete machine with multiple units designed for a special job are available. *W. K. Millholland Machinery Co., Inc.*

For more data circle No. 39 on postcard, p. 113.

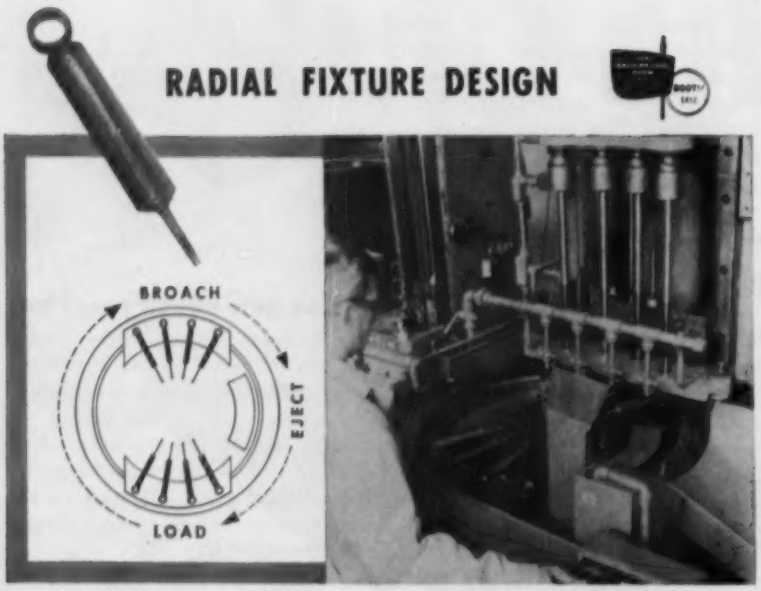
Turn Page



Portable testing machine for powder compacts

Through the proper choice of tooling, transverse rupture strength of a standard test bar can be read directly, or production parts can be tested for crushing or rupture strength on this portable tester. Each machine is furnished with a set of tools that allow direct testing of bushings according to Metal Powder Assoc. standard procedures and transverse rupture tests also to MPA standards. Direct comparative testing of gear tooth strength and similar parts is possible. *Haller, Inc.*

For more data circle No. 40 on postcard, p. 113.



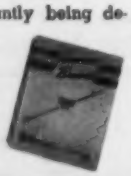
contributes to HIGH OUTPUT BROACHING the *American* way

While this American vertical pull-down broaching machine is broaching the inside diameter of four shock absorber yokes, the operator loads the opposite four radial stations of a rotating base fixture. At the end of the broaching stroke, the fixture indexes 90° and automatically ejects the parts down a chute. Fixture then rotates another 90° for loading while the second broaching cycle is begun.

Operation is push-button controlled — output over 1100 pieces per hour.

Unusual tooling to meet specialized production requirements is constantly being developed through creative engineering at American. Whether your broaching problem requires the best in automatic or automated control, or simply an economical adaptation of a standard machine, you will gain by referring your requirements to American. American has been making broaches, fixtures and broaching machines — all three — for over 35 years. To put this experience to work for you, send a blue print or sample part. An American recommendation will be furnished promptly.

Ask for Catalog No. 450.



American BROACH & MACHINE CO.
A DIVISION OF SUNDSTRAND MACHINE TOOL CO.
ANN ARBOR, MICHIGAN

See *American* First — for the Best in Broaching Tools, Broaching Machines, Special Machinery

Portable balancer

On-the-spot balancing can be accomplished by anyone with a new compact, self-contained portable balancer. Useful for large parts, it provides an industrial tool so that a complete vibration analysis as well as dynamic balancing can be done easily and accurately. The machine can balance parts at speeds of 250 rpm. Entire unit is housed in lightweight carrying case. *Tinius Olsen Machine Co.*

For more data circle No. 41 on postcard, p. 113.

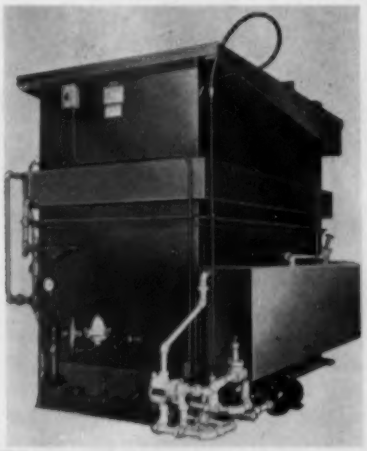
Pushbutton release

With thumb-button trigger and 35 ft range, this all-new dry chemical extinguisher provides long-distance, panic-proof fire protection. The units are approved by Underwriters. They are available in 6, 12, 20 and 30 lb sizes; can stop large oil and gasoline fires in seconds. Operating under 500-lb pressure, and long-range nozzles, the units attain record 40 ft streams. All-brass valve, trigger, and guard afford durability for heavy-duty, outside use. *Randolph Laboratories, Inc.*

For more data circle No. 42 on postcard, p. 113.

Vapor degreaser

New series of electric, gas or steam heated heavy duty degreasers clean parts or assemblies heavily laden with very thick soil —soluble, insoluble, or both. A double sump provides the key to the heavy duty feature of the machine. One sump contains the



heating element which brings the solvent to a boil. The other sump is a repository for the contaminated solvent which runs off from a drain plate above the boiling sump. Heavy particles settle out into a sludge pan in the settling sump, leaving the relatively clean solvent free to return to the boiling sump for reuse. Machines handle 4000 to 12,000 lb per hr. *Phillips Mfg. Co.*

For more data circle No. 43 on postcard, p. 113.

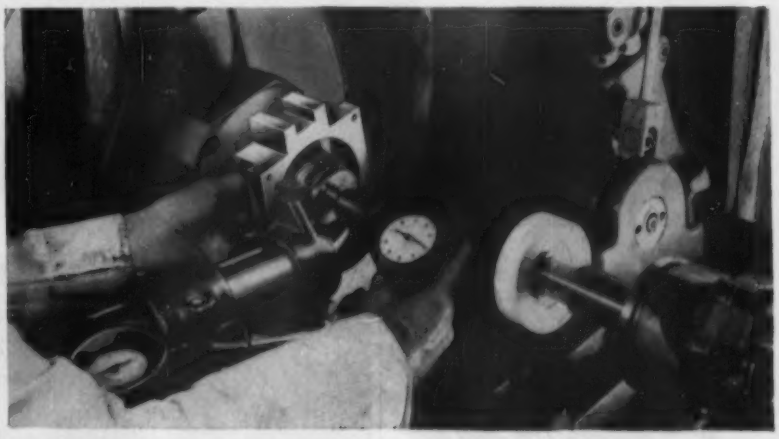
Humidity cabinet

A corrosion test humidity cabinet is used for testing the effectiveness of materials intended for the temporary protection of metals against corrosion by moisture. The cabinet produces a moisture saturated atmosphere with continuous condensation on the test specimens. Specifically designed for tests according to National Military Establishment Specification JAN-H-792, the cabinet can be used also for tests requiring extreme humidity at 75° to 150° F. A revolving stage specimen rack, motor driven at 1/3 rpm, holds 33 test panels. Thermostat regulates heat to within 2° F. *Precision Scientific Co.*

For more data circle No. 44 on postcard, p. 113.

Turn Page

BUT GAGES CAN TELL LIES! Some may not be sensitive enough to detect slight deviations from specified tolerances. Others may calibrate accurately only at the top and bottom of their scales. So, they pass work as OK when it actually isn't. That means costly filing, fitting, selecting and discarding in assembly operations . . . with expensive rework or salvage in addition. Only when you know your gages are right can you cut those costs.



ACCURATE AND SENSITIVE GAGES PAY OFF! Not infrequently gage users are surprised to learn that some of the gages they are using are really not showing up the actual dimensions — they're not sensitive enough. Consequently work is passed that does not conform with specifications — outsized work that later means costly rework, scrap, and assembly slow-down. Federal Gages are made sensitive to point out slight deviations and trends away from specifications and to enable you to make necessary adjustments *before* producing unsatisfactory work.

COMPARE GAGE SENSITIVITIES BEFORE YOU BUY! You'll find that Federal Gages lead the field in detecting minute variations in workpiece dimensions. That's why they cost less in the long run than lower-priced gages. For the complete story on the difference between gage cost and gage price, send for our free booklet, "A Management Blind Spot." It's "must" reading for all executives interested in cost reduction. Why not write today?

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Dial Indicating, Air, Electric, or Electronic — for inspecting, measuring, sorting, or automation gaging

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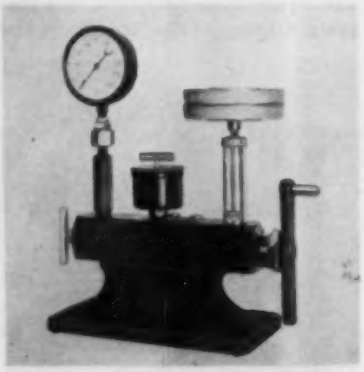
QUANTITY PRODUCTION OF GREY IRON CASTINGS

ONE OF THE NATION'S LARGEST AND MOST MODERN PRODUCTION FOUNDRIES

ESTABLISHED 1866
THE WHELAND COMPANY
CHATTANOOGA 2, TENN.

Pressure testers

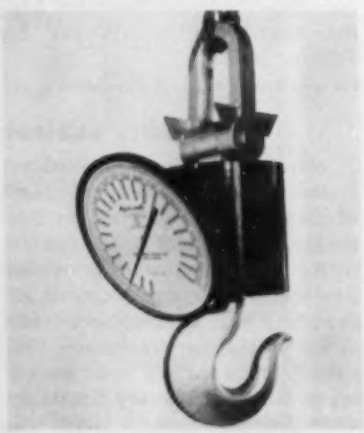
Improved models of dead weight pressure testers are sturdy in construction, modern and compact in design. Operation is simple—no skilled labor is required. Accuracy within 1/10 of 1 pct of the indicated reading is guaranteed. Three models are available: up to 3000 psi; from 4000 to 6000 psi; up to 10,000 psi. The complete unit is contained in a metal case. *Amthor Testing Instrument Co.*



For more data circle No. 45 on postcard, p. 113.

100-ton capacity

Especially designed for heavy equipment manufacturers, shipyards, contractors and business where high tonnage weighing is required the static hydraulic type scale has a capacity of 100 tons. It is said to be time-saving and practical in weighing extremely heavy loads by crane suspension means. A tare adjustment permits net load readings from the dial. *Hydroway Scales, Inc.*



For more data circle No. 46 on postcard, p. 113.

Turn Page

Order your size of TIMKEN® 52100 steel tubing today—we'll ship from mill stock tomorrow!

101 sizes of Timken® 52100 steel tubing are available in mill stock to take care of your rush hollow parts jobs. Order your size in less-than-mill quantities today, and we'll ship within 24 hours.

Timken 52100 steel tubing is excellent for most of your high quality hollow parts jobs. It's a through-hardening steel in moderate sections. It can be heat treated to file hardness and tempered back to any desired point. And it can be used in place of more expensive steels.

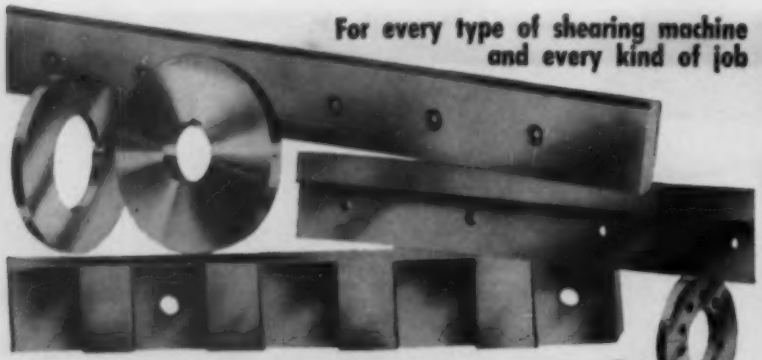
Available in sizes from 1″ to 10½″ O.D., Timken 52100 steel is used for hollow parts jobs like these: aircraft parts, ball bearing races, pump parts and plungers, collets, bushings, spindles, grinding machine parts, precision instruments, and dozens of other jobs.

The Timken Company is America's pioneer producer of 52100 tubing. And we're the only company that makes 52100 steel in tubing, bars and wire. Our unequaled experience assures you of uniform quality from tube to tube and heat to heat.

For immediate delivery of your less-than-mill quantity orders, write, wire or phone The Timken Roller Bearing Company, Steel and Tube Division, Canton 6, Ohio. Cable address: "TIMROSCO".

YEARS AHEAD—THROUGH EXPERIENCE AND RESEARCH

SPECIALISTS IN FINE ALLOY STEELS, GRAPHITIC TOOL STEELS AND SEAMLESS TUBING



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"multicut"

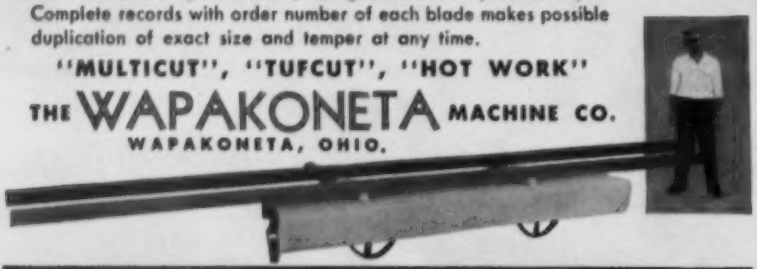
SHEAR BLADES and ROTARY KNIVES

Rx Engineered to the job . . . Every Wapakoneta blade is made to exact specifications, designed for the particular job. Complete records with order number of each blade makes possible duplication of exact size and temper at any time.

"MULTICUT", "TUFCUT", "HOT WORK"

THE WAPAKONETA MACHINE CO.

WAPAKONETA, OHIO.



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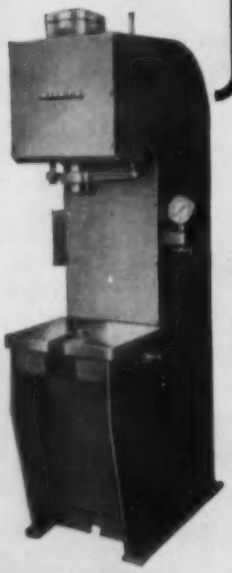
PRICE LIST

ON HANNIFIN STOCK HYDRAULIC PRESSES

1-TON	$ 552
2-TON	$ 627
5-TON	$1,286
8-TON	$1,581
10-TON	$1,855
25-TON	$3,681

Prices complete with motors and starters F.O.B. our press plant, St. Marys, Ohio, subject to change without notice.



DELIVERY FROM STOCK

Demand for these popular presses is so consistent we are able to produce them in quantity and pass the savings along to you.

Construction-wise and quality-wise these small general-purpose presses are identical to the larger Hannifin presses, up to 150 tons. Special, optional controls when needed.

WRITE for complete information on the Hannifin Hydraulic Press you're interested in.

HANNIFIN

HANNIFIN CORPORATION, 513 S. WOLF ROAD, DES PLAINES, ILLINOIS

Four point press

A Cleveland S4-500-108-72 four point press, double geared, is equipped with single station electrically controlled drum type air friction clutch and arranged with air operated bar knockout. Slide of the press is provided with air counterbalance and the flywheel is fitted with an

auxiliary air brake to bring it to a quick stop. Press has a capacity of 500 tons, a 20-in. stroke with 14 in. adjustment and a shut height of 40 in. Area of bed and face of slide is 72 in. x 108 in. *Cleveland Punch & Shear Works Co.*

For more data circle No. 47 on postcard, p. 113.

Multiple outlet pump

Multiple outlet gear pump, Model Z3U, is available with from 2 to 6 outlets. A new divider device, controlled automatically, enables each outlet to deliver an exactly measured quantity of lubricant independent of the prevailing counter

pressure. A single pair of special design gears insures precision operation with minimum power consumption. Pumps are made in different sizes. *Nathan Mfg. Corp.*

For more data circle No. 48 on postcard, p. 113.

Descaling 5 tons of stainless wire *IN 15 MINUTES* with VIRGO® Descaling Salt

10-MINUTE IMMERSION in molten bath of Virgo Descaling Salt at 900°F. loosens scale. The bath is self-regenerating, and produces no toxic fumes. Immersion time and temperature are flexible, need not be watched closely.

WATER QUENCH removes much of the loose scale. The steam generated by immersing the hot metal in the water further loosens scale by its blasting action. The work is thus prepared for the final acid dip.

THREE-MINUTE DIP in dilute acid removes the now soluble scale. The work is ready for a rinse or hosing to wash off the acid. **Result: a chemically clean surface—no pitting, etching or metal loss.** TOTAL TIME—15 MINUTES.

SEND FOR THESE BULLETINS—Get the whole story on Virgo Descaling Salt and Virgo Molten Cleaner—what they are, how they work, their advantages, how they fit your operations, and the Hooker services you enjoy as a user of the process. Send for these bulletins today.

VIRGO DESCALING SALT—Producers and fabricators of stainless and alloy steels use Virgo Descaling Salt to quickly, positively remove scale produced by hot rolling, forging, extruding, casting, annealing.

VIRGO MOLTEN CLEANER—quickly, positively desands and degraphitizes castings; removes grease, dirt, chemicals, paint, enamel, rubber, atmospheric corrosion and other impurities.

This process can be used on steel; castings; forgings; fabricated parts; material to be salvaged. It employs simple equipment, and is easily adapted to your production methods.

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Grinding 5-Start Worm with 4" Lead

STANDARD STYLE 36 EX-CELL-O *Precision* THREAD GRINDER

In the photograph at the left the operator is grinding a worm shaft for use in a special machine. The part is about 22" long and the worm is 4½" long, 3.430" O.D., has 5 starts, a pitch of .800", a lead of 4" and a tooth depth of .5454". The worm was ground in two operations on a standard Style 36 Thread Grinder. It was rough ground from the solid, hardened, then finish ground.

For complete information and specifications on the Style 36 and other Ex-Cell-O Thread Grinders contact your local representative or write today to Ex-Cell-O.

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A COMPLETE LINE OF PRECISION THREAD GRINDERS

STYLE 36 Precision Thread Grinder—a versatile machine for long external threads, available with internal attachment.

STYLE 50
Precision Thread Grinder—a versatile machine for external work, also available with internal attachment.

STYLE 33
Precision Thread Grinder—a high production machine for external work.

STYLE 39-A
Precision Thread Grinder—a high production machine for internal threads.

STYLE 120
Our largest Thread Grinder. Grinds 10 feet of thread in one setting. Accommodates 12 feet of stock between centers.

EX-CELL-O CORPORATION • Detroit 32, Michigan

MANUFACTURERS OF PRECISION MACHINE TOOLS • GRINDING SPINDLES • CUTTING TOOLS • RAILROAD PINS AND BUSHINGS • DRILL JIG BUSHINGS • AIRCRAFT AND MISCELLANEOUS PRODUCTION PARTS • DAIRY EQUIPMENT

Ad 55-19

The Iron Age SUMMARY . . .

Steel producers face three-pronged problem of scrap, maintenance, and order backlogs . . . Scrap getting out of hand . . . Day of reckoning on backlogs.

A Problem Trio . . . Three major problems are now breathing down the necks of steel producers. They are: (1) maintenance, (2) scrap, and (3) order backlogs. Either one is enough to wrinkle any steel executive's brow. But taken together they add up to a real first class nightmare.

The mills have been fighting a rearguard action with all three for months. The short steel strike seemed to bring things to a head. Now they've got to do something about them.

Created By Good Business . . . It's not an entirely unhappy situation. These problems are the outgrowth of exceptionally good business—so good that the mills can just about write their own ticket from an order standpoint over balance of the year.

Producers have been looking over their shoulders at the maintenance bugaboo for some time. They knew it eventually would catch up with them but they deferred it as long as they could. Now, maintenance is a factor in delaying their comeback to the pre-strike production level.

Scrap Running Away . . . Reports from producing centers indicate that required maintenance is holding down both steel and iron production.

The scrap market is getting out of hand. Prices are not only rising; they are literally going up by leaps and bounds. Behind the upsurge are these factors: earlier depressed prices that tended to dry up sources of dealer scrap, less hot iron due to blast furnace maintenance, and steel fabricator plant vacation shutdowns which reduce the flow of industrial scrap.

Backlogs Piling Up . . . Order backlogs have been piling up since early in second quarter. They have now extended to 60 days and more on the tighter products. The mills have tried to cope with this situation through an informal quota system to avoid hardship to their customers. This has helped considerably. But the day of reckoning has arrived.

The truck and barge line strikes in Pittsburgh heaped added burdens on overtaxed rail facilities and posed new shipping problems for producers in the area and their customers.

Boost from Grain Bins . . . Outlook for galvanized sheets, already strong, was strengthened further by the Government's announcement that it is planning another grain bin program.

Steel Output, Operating Rates

Production	This Week†	Last Week	Month Ago	Year Ago
(Net tons, 000 omitted)	2,268	2,219*	2,328	1,544
Ingot Index				
(1947—49=100)	141.0	138.0*	144.8	96.1
Operating Rates				
Chicago	96.5	96.0	97.5	70.0
Pittsburgh	100.0	92.0*	100.0	60.0
Philadelphia	97.5	94.0	98.4	56.0
Valley	95.0	95.0*	98.0	60.0
West	97.3	91.8*	97.0	83.0
Detroit	91.0	85.0*	92.0	60.0
Buffalo	105.0	86.0	105.0	56.0
Cleveland	99.0	99.0	101.6	61.0
Birmingham	93.7	94.0	93.5	76.0
S. Ohio River	82.3	81.6*	82.1	68.0
Wheeling	95.0	99.0*	97.0	86.0
St. Louis	88.0	92.0	106.1	47.5
Northeast	86.0	87.0	89.0	32.0
Aggregate	94.0	92.0*	96.5	64.5

*Revised. †Tentative

Prices At A Glance

(cents per lb unless otherwise noted)

	This Week	Week Ago	Month Ago	Year Ago
Composite price				
Finished Steel, base	5.176	5.178	4.797	4.801
Pig iron (Gross ton)	$59.09	$59.09	$56.59	$56.59
Scrap, No. 1 hvy (gross ton)	$40.33	$38.50	$35.33	$26.83
Nonferrous				
Aluminum, ingot	23.20	23.20	23.20	21.50
Copper, electrolytic	36.00	36.00	36.00	30.00
Lead, St. Louis	14.80	14.80	14.80	13.80
Magnesium, ingot	29.25	29.25	29.25	27.75
Nickel, electrolytic	67.67	67.67	67.67	63.08
Tin, Straits, N. Y.	97.875	95.75	94.50	96.625
Zinc, E. St. Louis	12.50	12.50	12.50	11.00

CR Strip Price Held Down

Small producers force cold-rolled strip price down . . . Hold increase to $10 a ton as against $14 level set by big mills . . . Cite competition as reason.

◆ SMALL PRODUCERS kicked over the traces on cold-rolled strip during the past week, forcing some major mills to backtrack on a $14-per-ton increase in this product.

Due to competitive forces, the smaller companies decided to hold the increase to $10 per ton. Their reasons included (1) competition from slit sheet, and (2) belief that circumstances justified only the $10 boost.

This development reduced the spread between hot-rolled strip and cold-rolled strip to $38.50 per ton, still better than the previous spread of $34 per ton. (THE IRON AGE, July 14, '55, p. 60.)

Detroit Steel Corp. was among the first to refuse to go along with the $14 increase. Detroit's price at Detroit is $6.35 per cwt, at its Portsmouth Div., $6.25 per cwt. Great Lakes and Weirton Steel Co., subsidiaries of National Steel Corp., also dropped their high strength low alloy c-r strip base to $9.20 and $9.10, respectively.

In another development, Jones & Laughlin Steel Corp. and Republic established a $4.60 base on carbon plates at Cleveland, a differential of $2 per ton between other producing points of the two companies.

In the introductory paragraph to steel price table on page 61 of the July 14, 1955, issue, effective date of U. S. Steel Corp. increases was incorrectly given as 12.01 a.m. July 3. Correct date is July 6.

From Washington comes word that the Govt. is getting ready to buy additional grain storage bins with capacity of at least 100 million bu.

Refractories prices this week advanced $7 to $8 per thousand in carload lots, and bulk materials were up $1 to $2 per ton.

SHEETS AND STRIPS . . . Automotive customers are still keeping up the pressure for more sheet and faster delivery in **Detroit**. It is beginning to look like fourth quarter is going to be sold out quickly. Cold-rolled strip is likewise tight and getting tighter in the automotive center. One warehouse says it can't get any more shipments until the end of September. A large **Cleveland** producer is reported quietly filling out fourth quarter order schedules—taking orders selectively with an eye to cutting down the overrun. With tremendous pressure currently on for deliveries, this producer is weighing fourth quarter business on the basis of how new orders fit operating schedules, with individual consumer needs coming second. Stainless is running out to 8 weeks on deliveries. In **Chicago**, some distributors are again being cut on their sheet allotments. Mills are glum about recovery from carryover during third quarter. Strip is holding solid all the way through third quarter. There's talk now of capacity operations in sheet for the remainder of the year with some quota reductions in fourth quarter. **Pittsburgh** reports sheet and strip delivery is now running two months late. Some mills are setting customer quotas for November and December delivery with no orders being accepted for October.

BARS . . . **West Coast** mill schedules on bars have run through the third quarter. Fourth quarter needs are likely to be heavier. Mills expect to soon have a backlog into first quarter 1956. Word from **Chicago** is that bars are the most confused product on the market. Current deliveries are running anywhere from 30 to 120 days, depending on size, makeup, and finish. Mills are reported sold out through third quarter with the situation much the same for fourth quarter. **Pittsburgh** consumer demand for bars is stronger than the current supply. Right now, mill production rates are lower than orders on the books. This means a further extension of delivery dates. Lead time on cold-finished bars in **Detroit** has in some cases stretched out to 75 days. All producers are behind on production schedules. In **Cleveland**, alloy and cold-finished bars are moving well with no major mill delivery problems reported.

STRUCTURALS AND SHAPES . . . **Chicago** structural production schedules are very tight with some carryovers reported. Wide flange beams are sold out for the rest of the year, with light structurals in about the same shape. On the **West Coast**, mills are booked through September, with a few openings reported for small shapes. Structurals are so tight in **Pittsburgh** that all customers will be receiving smaller tonnage than their quotas called for during the remainder of the year.

PLATES . . . In **Pittsburgh**, plate deliveries are currently running 4 to 6 weeks behind. Some producers are accepting orders for November and December on a quota basis only. **Chicago** reports plate is "gone for the year" with carryovers.

WIRE PRODUCTS . . . Current heavy demand for manufacturers wire in **Detroit** is expected to continue through fourth quarter. In **Cleveland**, delivery on merchant wire is running 4 to 5 weeks and 8 to 10 weeks on manufacturers wire. Manufacturers wire is sold out through third quarter in **Chicago**, is booked heavily for fourth quarter. Demand for construction wire in **Pittsburgh** is on the increase.

PIPE AND TUBING . . . A new $7 million irrigation project opening up in Mexico's Lower California portends increased business for pipe fabricators. Program calls for a large number of artesian wells.

Purchasing Agent's Checklist:

PRICES: There's an inflation spiral threatening ..... p. 51

SAVINGS: Hoover Report can save billions in Govt. ..... p. 54

SCRAP: Market on upsweep after spring slump ..... p. 55

POWER: Atomic-electric power goes on sale ..... p. 59

SAFETY: Plant safety program pays dividends ..... p. 77

Comparison of Prices

(Effective July 19, 1955)

Steel prices on this page are the average of various f.o.b. quotations of major producing areas: Pittsburgh, Chicago, Gary, Cleveland, Youngstown.

Price advances over previous week are printed in Heavy Type; declines appear in *Italics*.

	July 19 1955	July 12 1955	June 21 1955	July 20 1954
Flat-Rolled Steel: (per pound)				
Hot-rolled sheets	4.325¢	4.325¢	4.05¢	4.05¢
Cold-rolled sheets	5.325	5.325	4.95	4.95
Galvanized sheets (10 ga.)	5.85	5.85	5.45	5.45
Hot-rolled strip	4.325	4.325	4.05	4.05
Cold-rolled strip	6.375†	6.45	5.79	5.82
Plate	4.52	4.50	4.225	4.237
Plates wrought iron	9.30	9.30	9.30	9.30
Stain'l's C-R strip (No. 302)	44.50	44.50	41.50	41.50
Tin and Terneplate: (per base box)				
Tinplate (1.50 lb.) coke	$9.05	$9.05	$9.05	$8.95
Tinplate, electro (0.50lb.)	7.75	7.75	7.75	7.65
Special coated mfg. terne	7.85	7.85	7.85	7.75
Bars and Shapes: (per pound)				
Merchant bars	4.65¢	4.65¢	4.30¢	4.312¢
Cold-finished bars	5.90	5.90	5.40	5.40
Alloy bars	5.65	5.85	5.075	5.075
Structural shapes	4.60	4.60	4.25	4.25
Stainless bars (No. 302)	38.25	38.25	35.50	35.50
Wrought iron bars	10.40	10.40	10.40	10.40
Wire: (per pound)				
Bright wire	6.25¢	6.25¢	5.75¢	5.75¢
Rails: (per 100 lb.)				
Heavy rails	$4.725	$4.725	$4.45	$4.45
Light rails	5.65	5.65	5.35	5.35
Semifinished Steel: (per net ton)				
Rerolling billets	$68.50	$68.50	$64.00	$64.00
Slabs, rerolling	68.50	68.50	64.00	64.00
Forging billets	84.50	84.50	78.00	78.00
Alloy blooms, billets, slabs	96.00	96.00	86.00	86.00
Wire Rod and Skelp: (per pound)				
Wire rods	5.025¢	5.025¢	4.675¢	4.675¢
Skelp	4.225	4.225	3.90	3.90
Finished Steel Composite: (per pound)				
Base price	5.176¢†	5.178¢	4.797¢	4.801¢

	July 19 1955	July 12 1955	June 21 1955	July 20 1954
Pig Iron: (per gross ton)				
Foundry, del'd Phila.	$63.69	$63.69	$61.19	$61.19
Foundry, Valley	59.00	59.00	56.50	56.50
Foundry, Southern, Cin'ti	62.93	62.93	60.43	60.43
Foundry, Birmingham	55.38	55.38	52.88	52.88
Foundry, Chicago	59.00	59.00	56.50	56.50
Basic, del'd Philadelphia	62.77	62.77	60.27	60.27
Basic, Valley furnace	58.50	58.50	56.00	56.00
Malleable, Chicago	59.00	59.00	56.50	56.50
Malleable, Valley	59.00	59.00	56.50	56.50
Ferromanganese‡, cents per lb.	9.50¢	9.50¢	9.50¢	10.00¢

‡ 74-76 pct Mn base.

Pig Iron Composite: (per gross ton)				
Pig iron	$59.09	$59.09	$56.59	$56.59
Scrap: (per gross ton)				
No. 1 steel, Pittsburgh	$41.50	$39.50	$35.50	$28.50
No. 1 steel, Phila. area	41.50	39.50	37.00	25.50
No. 1 steel, Chicago	39.50	36.50	33.50	28.50
No. 1 bundles, Detroit	32.50	32.50	27.00	22.00
Low phos., Youngstown	42.50	40.50	35.50	39.50
No. 1 mach'y cast, Pittsburgh	44.50	43.50	43.50	42.50
No. 1 mach'y cast, Philadel'a.	44.50	44.50	44.50	39.50
No. 1 mach'y cast, Chicago	49.50	48.50	45.50	39.50
Steel Scrap Composite: (per gross ton)				
No. 1 heavy melting scrap	$40.33	$38.50	$35.33	$26.83
Coke, Connellsville: (per net ton at oven)				
Furnace coke, prompt	$15.25	$15.25	$15.25	$14.38
Foundry coke, prompt	16.25	16.25	16.25	16.75
Nonferrous Metals: (cents per pound to large buyers)				
Copper, electrolytic, Conn.	36.00	36.00	36.00	30.00
Copper, Lake, Conn.	36.00	36.00	36.00	30.00
Tin, Straits, New York	97.875†	95.75*	94.50	96.625
Zinc, East St. Louis	12.50	12.50	12.50	11.00
Lead, St. Louis	14.80	14.80	14.80	13.80
Aluminum, virgin ingot	23.20	23.20	23.20	21.50
Nickel, electrolytic	67.67	67.67	67.67	63.08
Magnesium, ingot	29.25	29.25	29.25	27.75
Antimony, Laredo, Tex.	28.50	28.50	28.50	28.50

† Tentative. ‡ Average. * Revised.

Finished Steel Composite

Weighted index based on steel bars, shapes, plates, wire, rails, black pipe, hot and cold rolled sheets and strips

Pig Iron Composite

Based on averages for basic iron at Valley furnaces and foundry iron at Chicago, Philadelphia, Buffalo, Valley and Birmingham.

Steel Scrap Composite

Average of No. 1 heavy melting steel scrap delivered to consumers at Pittsburgh, Philadelphia and Chicago.

PIG IRON

Dollars per gross ton, f.o.b., subject to switching charges.

←To identify producers, see Key on P. 160→

Producing Point	Basic	Fdry.	Mall.	Bess.	Low Phos.
Bethlehem *B3*	60.50	61.00	61.50	62.00	.....
Birdsboro, Pa. *B6*	60.50	61.00	61.50	62.00	.....
Birmingham *R3*	54.50	55.00	.....	.....	.....
Birmingham *W9*	54.50	55.00	.....	.....	.....
Birmingham *U4*	54.50	55.00	59.00	.....	.....
Buffalo *R3*	58.50	59.00	59.50	.....	.....
Buffalo *H1*	58.50	59.00	59.50	.....	.....
Buffalo *W6*	58.50	59.00	59.50	60.00	.....
Chester *C17*	54.50	55.00	55.50	.....	.....
Chicago *I4*	58.50	59.00	59.00	59.50	.....
Cleveland *A5*	58.50	59.00	59.00	59.50	63.50
Cleveland *R3*	58.50	59.00	59.00	.....	.....
Daingerfield *L3*	55.00	55.00	55.00	.....	.....
Duluth *I4*	58.50	59.00	59.00	59.50	.....
Erie *I4*	58.50	59.00	59.00	59.50	.....
Everett *M6*	.....	61.00	61.50	.....	.....
Fontana *K1*	64.50	65.00	.....	.....	.....
Geneva, Utah *C7*	58.50	59.00	.....	.....	.....
Granite City *G2*	60.40	60.90	61.40	.....	.....
Hubbard *Y1*	.....	.....	59.00	.....	.....
Minnequa *C6*	60.50	61.00	61.50	.....	.....
Monessen *P6*	58.50	.....	.....	.....	.....
Neville Is. *P4*	58.50	59.00	59.00	.....	.....
N. Tonawanda *T1*	.....	59.00	59.50	.....	.....
Pittsburgh *U1*	58.50	.....	.....	59.50	.....
Sharpsville *S3*	58.50	59.00	59.00	59.50	.....
So. Chicago *R3*	58.50	.....	59.00	.....	.....
Steelton *B3*	60.50	61.00	61.50	62.00	66.50
Swedeland *A2*	60.50	61.00	61.50	62.00	.....
Toledo *I4*	58.50	59.00	59.00	59.50	.....
Troy, N. Y. *R3*	60.50	61.00	61.50	62.00	66.50
Youngstown *Y1*	.....	.....	59.00	59.50	.....

* **DIFFERENTIALS:** Add, 50¢ per ton for each 0.25 pct silicon over base (1.75 to 2.25 pct except low phos., 1.75 to 2.00 pct) 50¢ per ton for each 0.50 pct manganese over 1 pct, $2 per ton for 0.5 to 0.75 pct nickel, $1 for each additional, 0.25 pct nickel. Subtract 38¢ per ton for phosphorus content 0.70 and over.

* Silvery Iron: Buffalo, *H1*, $66.25; Jackson, *J1, G1*, $65.00. Add $1.00 per ton for each 0.50 pct silicon over base (6.01 to 6.50 pct) up to 17 pct. Add $1 per ton for 0.75 pct or more phosphorus. Add 75¢ for each 0.50 pct manganese over 1.0 pct. Bessemer ferrosilicon prices are $1 over comparable silvery iron.

* Unrevised.

STAINLESS STEEL

Base price cents per lb. f.o.b. mill

Product	301	302	303	304	316	321	347	410	416	430
Ingots, rerolling	17.75	19.00	—	20.25	31.50	25.00	37.75	15.00	—	15.25
Slabs, billets, rerolling	22.25	24.75	26.75	26.00	40.25	32.00	49.50	19.50	—	19.75
Forg. discs, die blocks, rings	—	—	—	—	—	—	—	—	—	—
Billets, forging	—	32.00	34.75	33.75	51.25	38.25	58.00	25.50	26.00	26.00
Bars, wires, structurals	38.00	38.25	41.00	40.25	60.75	45.25	68.00	30.50	31.00	31.00
Plates	—	40.25	—	43.00	64.00	49.25	73.25	31.75	—	32.25
Sheets	44.25	44.50	—	47.25	68.25	54.25	82.00	36.25	—	36.75
Strip, hot-rolled	32.00	34.50	—	37.25	58.25	44.25	66.75	—	—	—
Strip, cold-rolled	41.00	44.50	—	47.25	68.25	54.25	82.00	36.25	—	36.75

STAINLESS STEEL PRODUCING POINTS:

Sheets: Midland, Pa., *C11*; Brackenridge, Pa., *A3*; Butler, Pa., *A7*; McKeesport, Pa., *U1*; Washington, Pa., *W1, J2*; Baltimore, *E1*; Middletown, O., *A7*; Massillon, O., *R3*; Gary, *U1*; Bridgeville, Pa., *U2*; New Castle, Ind., *I2*; Ft. Wayne, *J4*; Philadelphia, *D5*.

Strip: Midland, Pa., *C11*; Cleveland, *A5*; Carnegie, Pa., *S9*; McKeesport, Pa., *F1*; Reading, Pa., *C2*; Washington, Pa., *W2*; W. Leechburg, Pa., *A3*; Bridgeville, Pa., *U2*; Detroit, *M2*; Canton-Massillon, O., *R3*; Middletown, O., *A7*; Harrison, N. J., *D3*; Youngstown, *C5*; Sharon, Pa., *S1*; Butler, Pa., *A7*; Wallingford, Conn., *U5*; .25¢ per lb higher; *W1* (.25¢ per lb higher); New Bedford, Mass., *R6*.

Bar: Baltimore, *A7*; Duquesne, Pa., *U1*; Munhall, Pa., *U1*; Reading, Pa., *C2*; Titusville, Pa., *U2*; Washington, Pa., *J2*; McKeesport, Pa., *U1, F1*; Bridgeville, Pa., *U2*; Dunkirk, N. Y., *A3*; Massillon, O., *R3*; Chicago, *U1*; Syracuse, N. Y., *C11*; Watervliet, N. Y., *A3*; Waukegan, *A5*; Canton, O., *T5*; Ft. Wayne, *I4*; Philadelphia, *D5*.

Wire: Waukegan, *A5*; Massillon, O., *R3*; McKeesport, Pa., *F1*; Ft. Wayne, *J4*; Harrison, N. J., *D3*; Baltimore, *A7* Dunkirk, *A3*; Monessen, *P1*; Syracuse, *C11*; Bridgeville, *U2*.

Structurals: Baltimore, *A7*; Massillon, O., *R3*; Chicago, Ill., *J4*; Watervliet, N. Y., *A3*; Syracuse, *C11*.

Plates: Brackenridge, Pa., *A3*; Chicago, *U1*; Munhall, Pa., *U1*; Midland, Pa., *C11*; New Castle, Ind., *I2*; Middletown, *A7*; Washington, Pa., *J2*; Cleveland, Massillon, *R3*; Coatesville, Pa., *C15*; Philadelphia, *D5*.

Forged discs, die blocks, rings: Pittsburgh, *C11*; Syracuse, *C11*; Ferndale, Mich., *A3*; Washington, Pa., *J2*.

Forgings billets: Midland, Pa., *C11*; Baltimore, *A7*; Washington, Pa., *J2*; McKeesport, *F1*; Massillon, Canton, O., *R3*; Watervliet, *A3*; Pittsburgh, Chicago, *U1*; Syracuse, *C11*.

Price Surge Upward Again

Chicago reports $3 to $4 gains . . . Price of No. 1 heavy melting jumps $2 in Pittsburgh and Philadelphia . . . Other areas strong . . . Composite up $2.33 to $40.83.

◆ ANY NOTION that the scrap market was ready to level off was dispelled this week as the three major centers registered gains of $2 or more in the best steelmaking grades.

Chicago leads the way in this latest advance with price advances in all grades. No. 1 heavy melting jumped twice during the week, winding up $3 over last week's figure on the topside.

In Pittsburgh, mill purchases failed to check the upward surge and prices continued climbing on pressure at the broker buying level.

In the East all mills were reported buying and, for the first time in months, domestic consumers had taken the play away from export. Export continues strong, meeting mill prices, but it is the domestic consumer who is setting the price pace.

Advances in major markets sent the IRON AGE Composite for No. 1 heavy melting steel scrap up another $2.33 to $40.83.

Pittsburgh . . . Last week's scrap purchases by two of the district's leading consumers failed to stabilize the market as expected. The new purchases set the price of No. 1 heavy melting at $40; No. 2 hvy. melting at $37, and No. 2 bundles at $34. However, the price was already up another $2 for No. 1 heavy melting as brokers were paying $41 and higher to fill both the current orders and the old $35 orders. No. 2 heavy melting and No. 2 bundles advanced another dollar to $38 and $35 respectively. Low phos was up a dollar on the basis of the latest mill purchase. RR scrap prices were up sharply as the latest RR lists reflected the tight scrap picture in the area. Cast iron grades also advanced $1.

Chicago . . . The lid tore off Chicago's slow advance last week when mills purchased No. 1 RR at $45. No. 1 advanced immediately by $1 and then rose again at the end of the week. Cast, despite the vacation season, shows no weakness in price and even seems to be advancing. All grades are moving in heavy tonnages. Further furnace repairs by reducing the available amount of hot metal in the mills are strengthening the current boom.

Philadelphia . . . On the basis of a recent purchase by a large area consumer of No. 1 heavy melting and No. 2 bundles, prices for these top steelmaking grades are now pegged at the topside level of $42 and $34 a ton respectively. No. 2 heavy melting and blast furnace grades moved up $1.50 in sympathy. Most other grades show broad gains over last week's listings. The market continues to hold firm and steady with scrap somewhat easier than for several weeks past.

New York . . . Prices of steelmaking and blast furnace grades advanced $1 to $1.50 on the average as all mills were buying and supplies were tight. Advancing prices have not stepped up the production of scrap as fast as brokers would like. Plant shutdowns have cutdown scrap generating rates. Export buyers are meeting mill prices but for the first time in months, domestic consumers have taken the play away from the foreign market.

Detroit . . . No new activity was reported here this week and the market is expected to stay on its present firm level for two reasons. First, brokers in the area are still short on orders due to their failure to obtain sufficient tonnages off the July auto lists. Secondly, at least one mill is expected to start closing down blast furnaces soon for much needed repairs.

Cleveland . . . No. 1 heavy melting prices held firm in the Valley and Cleveland last week, based on Valley sales, but secondary grades showed unexpected weakness. Substantial tonnages of No. 2 heavy melting and bundles were bought for $2 under the normal spread while top grades were reported getting premium prices. A comeback was expected in secondary grades in the next few weeks.

Birmingham . . . The scrap market continues to lag this week, with the export market furnishing most of the activity. Buyers of openhearth scrap were still out of the market and only a limited amount of electric furnace grades moved. An Atlanta mill indicated it would buy again next week, but the largest buyer in the district has a good inventory and may not be in the market.

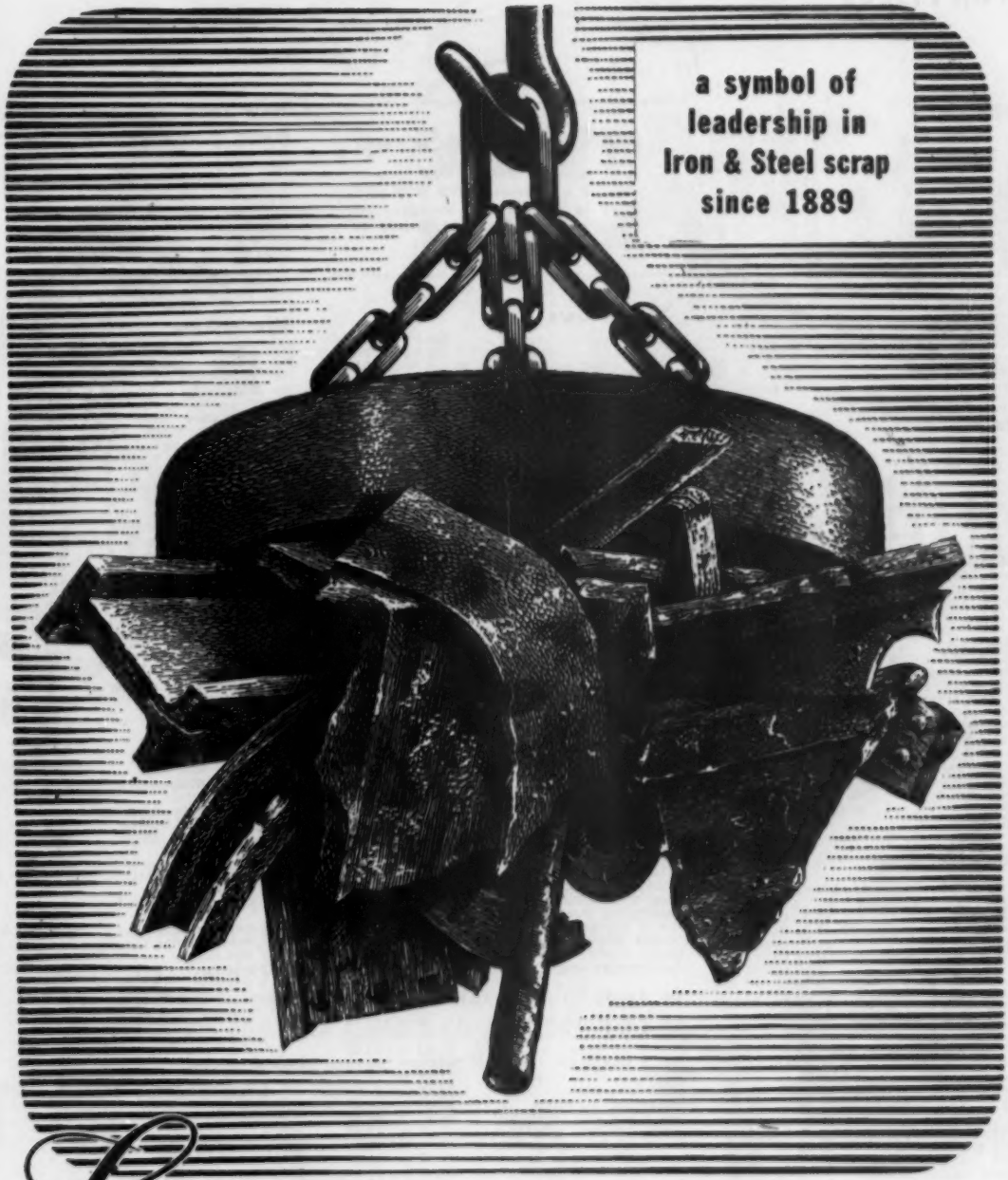
St. Louis . . . Several furnaces were down for repairs during the week bringing the operating rate down 4 points to 88 pct. Pending reopening of foundries closed by vacations, no action has been taken on expected cast iron advances. Hot weather and vacations in yards have slowed down the movement of scrap. No price changes.

Cincinnati . . . A strike of river bargemen this week stopped all water shipment of scrap to the hot Pittsburgh market and a local mill continued to coast on June orders following a vacation shutdown. Barge strike was also stopping eastward shipments from Louisville area and other sources into Cincinnati area and eastward to consuming centers.

Buffalo . . . Strength continues to dominate local scrap market as dealers report difficulty finding ample material to cover recent sales at sharply higher prices. Substantial buying by outside sources at current levels is also reported.

Boston . . . Prices of best steelmaking grades advanced $1 in a market that is still on the slack side. Pittsburgh mills have been in the market to a small extent. Eastern Pennsylvania and export demand is a little stronger. But on the whole the market remains dull as vacations are preventing any strong recovery.

West Coast . . . Domestic demand for scrap in San Francisco, Los Angeles and Seattle continues strong and export volume remains heavy. Mill inventories reported in good shape.



Luria Brothers and Company, Inc.

MAIN OFFICE

LINCOLN-LIBERTY BLDG.

Philadelphia 7, Penna.

PLANTS

LEBANON, PENNA.
READING, PENNA.
MODENA, PENNA.
DETROIT (ECORSE), MICHIGAN
PITTSBURGH, PENNA.
ERIE, PENNA.

OFFICES

BIRMINGHAM, ALA.
BOSTON, MASS.
BUFFALO, N. Y.
CHICAGO, ILLINOIS
CLEVELAND, OHIO
DETROIT, MICHIGAN
HOUSTON, TEXAS
LEBANON, PENNA.
LOS ANGELES, CAL.
NEW YORK, N. Y.
SEATTLE, WASH.
PITTSBURGH, PENNA.
PUEBLO, COLORADO
READING, PENNA.
ST. LOUIS, MO.
SAN FRANCISCO, CAL.

Scrap Prices *(Effective July 19, 1955)*

Pittsburgh

No. 1 hvy. melting	$41.00 to $42.00
No. 2 hvy. melting	37.00 to 38.00
No. 1 bundles	41.00 to 42.00
No. 2 bundles	34.00 to 35.00
Machine shop turn.	22.50 to 23.50
Mixed bor. and ms. turns.	22.50 to 23.50
Shoveling turnings	26.50 to 27.50
Cast iron borings	26.50 to 27.50
Low phos. punch'gs, plate	43.00 to 44.00
Heavy turnings	38.00 to 39.00
No. 1 RR. hvy. melting	43.50 to 44.50
Scrap rails, random lgth.	47.50 to 48.50
Rails 2 ft and under	51.00 to 52.00
RR. steel wheels	48.00 to 49.00
RR. spring steel	48.00 to 49.00
RR. couplers and knuckles	48.00 to 49.00
No. 1 machinery cast	44.00 to 45.00
Cupola cast	40.00 to 41.00
Heavy breakable cast	35.00 to 36.00

Chicago

No. 1 hvy. melting	$39.00 to $40.00
No. 2 hvy. melting	35.00 to 36.00
No. 1 factory bundles	42.00 to 43.00
No. 1 dealers' bundles	39.00 to 40.00
No. 2 dealers' bundles	28.00 to 29.00
Machine shop turn	24.00 to 25.00
Mixed bor. and turn.	26.00 to 27.00
Shoveling turnings	26.00 to 27.00
Cast iron borings	26.00 to 27.00
Low phos. forge crops	45.00 to 46.00
Low phos. punch'gs, plate	43.00 to 44.00
Low phos. 2 ft and under	41.00 to 42.00
No. 1 RR. hvy. melting	44.00 to 45.00
Scrap rails, random lgth.	44.00 to 45.00
Rerolling rails	59.00 to 60.00
Rails 2 ft and under	56.00 to 57.00
Locomotive tires, cut	42.00 to 43.00
Cut bolsters & side frames	45.00 to 46.00
Angles and splice bars	50.00 to 51.00
RR. steel car axles	49.00 to 50.00
RR. couplers and knuckles	47.00 to 48.00
No. 1 machinery cast	49.00 to 50.00
Cupola cast	45.00 to 46.00
Heavy breakable cast	36.00 to 37.00
Cast iron brake shoes	36.00 to 38.00
Cast iron car wheels	41.00 to 42.00
Malleable	49.00 to 50.00
Stove plate	36.00 to 37.00

Philadelphia Area

No. 1 hvy. melting	$41.00 to $42.00
No. 2 hvy. melting	35.50 to 36.50
No. 1 bundles	41.00 to 42.00
No. 2 bundles	33.00 to 34.00
Machine shop turn.	24.00 to 25.00
Mixed bor. short turn.	24.00 to 25.00
Cast iron borings	24.00 to 25.00
Shoveling turnings	26.50 to 27.50
Clean cast chem. borings	27.00 to 28.00
Low phos. 5 ft and under	44.00 to 45.00
Low phos. 2 ft and under	45.00 to 46.00
Low phos. punch'gs	45.00 to 46.00
Elec. furnace bundles	43.00 to 44.00
Heavy turnings	36.00 to 37.00
RR. steel wheels	44.00 to 45.00
RR. spring steel	44.00 to 45.00
Rails 18 in. and under	51.00 to 52.00
Cupola cast	36.00 to 37.00
Heavy breakable cast	42.00 to 43.00
Cast iron car wheels	46.00 to 47.00
Malleable	45.50 to 46.50
Unstripped motor blocks	27.00 to 28.00
No. 1 machinery cast	44.00 to 45.00

Cleveland

No. 1 hvy. melting	$38.00 to $39.00
No. 2 hvy. melting	32.50 to 33.50
No. 1 bundles	38.00 to 39.00
No. 2 bundles	29.50 to 30.50
No. 1 busheling	38.00 to 39.00
Machine shop turn.	21.00 to 22.00
Mixed bor. and turn.	24.00 to 26.00
Shoveling turnings	24.00 to 26.00
Cast iron borings	24.00 to 26.00
Cut struct'r'l & plates, 2 ft & under	45.00 to 46.00
Drop forge flashings	38.00 to 39.00
Low phos. punch'gs, plate	39.00 to 40.00
Foundry steel, 2 ft & under	44.00 to 45.00
No. 1 RR. heavy melting	40.00 to 42.00
Rails 2 ft and under	52.00 to 53.00
Rails 18 in. and under	53.00 to 54.00
Railroad grate bars	33.00 to 34.00
Steel axle turnings	29.00 to 30.00
Railroad cast	47.00 to 48.00
No. 1 machinery cast	47.00 to 48.00
Stove plate	43.00 to 44.00
Malleable	47.00 to 48.00

Iron and Steel Scrap

Going prices of iron and steel scrap as obtained in the trade by THE IRON AGE based on representative tonnages. All prices are per gross ton delivered to consumer unless otherwise noted.

Youngstown

No. 1 hvy. melting	$40.00 to $41.00
No. 2 hvy. melting	35.00 to 36.00
No. 1 bundles	40.00 to 41.00
No. 2 bundles	33.00 to 34.00
Machine shop turn.	22.00 to 23.00
Shoveling turnings	27.00 to 28.00
Cast iron borings	27.00 to 28.00
Low phos. plate	42.00 to 43.00

Buffalo

No. 1 hvy. melting	$34.00 to $35.00
No. 2 hvy. melting	29.00 to 30.00
No. 1 busheling	34.00 to 35.00
No. 1 bundles	34.00 to 35.00
No. 2 bundles	26.00 to 27.00
Machine shop turn.	21.00 to 22.00
Mixed bor. and turn.	23.00 to 24.00
Shoveling turnings	34.00 to 35.00
Cast iron borings	23.00 to 24.00
Low phos. plate	37.00 to 38.00
Scrap rails, random lgth.	39.00 to 40.00
Rails 2 ft and under	44.00 to 45.00
RR. steel wheels	36.00 to 37.00
RR. spring steel	36.00 to 37.00
RR. couplers and knuckles	36.00 to 37.00
No. 1 machinery cast	42.00 to 43.00
No. 1 cupola cast	36.00 to 37.00

Detroit

Brokers buying prices per gross ton, on cars:

No. 1 hvy. melting	$32.00 to $33.00
No. 2 hvy. melting	23.00 to 24.00
No. 1 bundles, openhearth	32.00 to 33.00
No. 2 bundles	21.00 to 22.00
New busheling	32.00 to 33.00
Drop forge flashings	31.50 to 32.50
Machine shop turn.	16.00 to 17.00
Mixed bor. and turn.	18.50 to 19.50
Shoveling turnings	18.50 to 19.50
Cast iron borings	18.50 to 19.50
Low phos. punch'gs, plate	32.00 to 33.00
No. 1 cupola cast	35.00 to 37.00
Heavy breakable cast	27.00 to 28.00
Stove plate	31.00 to 32.00
Automotive cast	40.00 to 41.00

St. Louis

No. 1 hvy. melting	$31.00 to $32.00
No. 2 hvy. melting	29.00 to 30.00
No. 1 bundles	31.00 to 32.00
No. 2 bundles	24.50 to 25.50
Machine shop turn.	17.50 to 18.50
Cast iron borings	19.50 to 20.50
Shoveling turnings	19.50 to 20.50
No. 1 RR. hvy. melting	36.00 to 37.00
Rails, random lengths	41.00 to 42.00
Rails, 18 in. and under	49.00 to 50.00
Locomotive tires uncut	38.00 to 39.00
Angles and splice bars	38.00 to 39.00
Std. steel car axles	37.50 to 38.50
RR. specialties	38.00 to 39.00
Cupola cast	42.00 to 43.00
Hvy. breakable cast	34.00 to 35.00
Cast iron brake shoes	32.00 to 33.00
Stove plate	35.00 to 36.00
Cast iron car wheels	35.00 to 36.00
Malleable	35.00 to 36.00
Unstripped motor blocks	33.50 to 34.50

Boston

Brokers buying prices per gross ton, on cars:

No. 1 hvy. melting	$31.00 to $32.00
No. 2 hvy. melting	22.00 to 23.00
No. 1 bundles	31.00 to 32.00
No. 2 bundles	21.50 to 22.00
No. 1 busheling	31.00 to 32.00
Elec. furnace, 2 ft & under	33.00 to 34.00
Machine shop turn.	13.00 to 14.00
Mixed bor. and short turn.	15.00 to 15.50
Shoveling turnings	16.25 to 16.75
Clean cast chem. borings	17.00 to 18.00
No. 1 machinery cast	30.00 to 31.00
Mixed cupola cast	28.00 to 29.00
Heavy breakable cast	29.00 to 30.00
Stove plate	28.00 to 29.00
Unstripped motor blocks	17.00 to 18.00

New York

Brokers buying prices per gross ton, on cars:

No. 1 hvy. melting	$36.00
No. 2 hvy. melting	$31.50 to 32.00
No. 2 bundles	25.00 to 26.00
Machine shop turn.	16.00 to 17.00
Mixed bor. and turn.	17.50 to 18.00
Shoveling turnings	18.00 to 18.50
Clean cast chem. borings	21.00 to 22.00
No. 1 machinery cast	35.00 to 37.00
Mixed yard cast	32.00 to 33.00
Charging box cast	35.50 to 36.00
Heavy breakable cast	35.50 to 36.00
Unstripped motor blocks	22.00 to 23.00

Birmingham

No. 1 hvy. melting	$29.00 to $30.00
No. 2 hvy. melting	25.00 to 26.00
No. 1 bundles	29.00 to 30.00
No. 2 bundles	18.00 to 19.00
No. 1 busheling	29.00 to 30.00
Machine shop turn.	18.00 to 19.00
Shoveling turnings	24.00 to 25.00
Cast iron borings	15.00 to 16.00
Electric furnace bundles	32.00 to 33.00
Bar crops and plate	36.00 to 37.00
Structural and plate, 2 ft	36.00 to 37.00
No. 1 RR. hvy. melting	35.00 to 36.00
Scrap rails, random lgth.	40.00 to 41.00
Rails, 18 in. and under	45.00 to 46.00
Angles & splice bars	43.00 to 44.00
Shoveling turnings	24.00 to 25.00
No. 1 cupola cast	45.00 to 46.00
Stove plate	42.00 to 43.00
Charging box cast	22.00 to 23.00
Cast iron car wheels	33.00 to 34.00
Unstripped motor blocks	34.50 to 35.50
Mashed tin cans	15.00 to 16.00

Cincinnati

Brokers buying prices per gross ton, on cars:

No. 1 hvy. melting	$35.00 to $36.00
No. 2 hvy. melting	31.00 to 32.00
No. 1 bundles	35.00 to 36.00
No. 2 bundles	26.00 to 27.00
Machine shop turn.	20.00 to 21.00
Mixed bor. and turn.	19.00 to 20.00
Shoveling turnings	23.00 to 24.00
Cast iron borings	20.00 to 21.00
Low phos., 18 in. & under	40.00 to 41.00
Rails, random lengths	42.00 to 43.00
Rails, 18 in. and under	49.00 to 50.00
No. 1 cupola cast	42.00 to 43.00
Hvy. breakable cast	36.00 to 37.00
Drop broken cast	46.00 to 47.00

San Francisco

No. 1 hvy. melting	$32.00
No. 2 hvy. melting	30.00
No. 1 bundles	32.00
No. 2 bundles	27.00
No. 3 bundles	23.00
Machine shop turn.	12.00
Cast iron borings	11.00
No. 1 RR. hvy. melting	32.00
No. 1 cupola cast	42.00

Los Angeles

No. 1 hvy. melting	$32.00
No. 2 hvy. melting	30.00
No. 1 bundles	32.00
No. 2 bundles	25.00
No. 3 bundles	22.00
Machine shop turn.	10.00
Shoveling turnings	12.00
Cast iron borings	12.00
Elec. furn. 1 ft. and under	32.00
No. 1 RR. hvy. melting	32.00
No. 1 cupola cast	42.00

Seattle

No. 1 hvy. melting	$33.00
No. 2 hvy. melting	29.00
No. 2 bundles	23.00
No. 3 bundles	19.00
No. 1 cupola cast	35.00
Mixed yard cast	35.00

Hamilton, Ont.

No. 1 hvy. melting	$34.00
No. 2 hvy. melting	31.00
No. 1 bundles	34.00
No. 2 bundles	28.00
Mixed steel scrap	28.00
Bushelings	29.00
Bush., new fact prep'd	32.00
Bush., new fact unprep'd	28.00
Machine shop turn.	16.00
Short steel turnings	21.00
Mixed bor. and turn.	$16.00 to 17.00
Rails, rerolling	43.00
Cast scrap	42.00 to 45.00

Chaucer's Sheffield Whittle

In 14th Century England, Sheffield was already famous for its fine cutlery. Geoffrey Chaucer, diplomat, business man and renowned poet, wrote of the "Sheffield Whittle" as being in common use—more than six hundred years ago.

Today, knives for "whittling," for industry, for agriculture, for the military, are required in millions of units—just one of the nation's numerous demands for steel. To fulfill these demands, a never failing flow of scrap is indispensable.

For the purchase or sale of iron or steel scrap...

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231 S. La Salle St., Chicago

Telephone ANdover 3-3900

Copper Outlook Clearing Up

Early this week there were signs the copper labor impasse might be nearing an end . . . Anaconda settlement raises hopes . . . Brass ingot prices are boosted again.

◆ SURPRISINGLY lengthy copper strike was still in full force early this week, but there were some encouraging signs that a settlement might be in the offing.

Most promising development was the fact that miners at Anaconda's Butte, Mont., property late last week approved a company wage offer which provided pay increases ranging from 11.50¢ to 17.50¢ per hour.

The same proposal was to have been voted on by other Anaconda employees at Butte, Great Falls and Anaconda, Mont. Because of the decisiveness of the last week's vote (2118 for, 590 against), it was expected that acceptance of the wage increase will be approved by the other Anaconda unions.

Result is it seems that the only major U. S. copper producer which has not been hit by a strike will be the first to reach an agreement with the International Union of Mine, Mill & Smelter Workers.

It was hoped that the Anaconda agreement might break up the labor log jams at Phelps Dodge, Kennecott and American Smelting & Refining. However, according to latest reports the union was still holding out for a wage increase of 20¢ an hour from these companies.

Preceding the Anaconda agreement at Butte was settlement of the week-old strike at the American Brass Co.'s plants at Ansonia and Torrington, Conn., and Buffalo, N. Y., for a basic 11.50¢ per hour wage boost with additional increases of ½¢ an hour each for higher job classifications.

Meanwhile, the government, taking a quick look at the copper situation, has decided that the copper shortage will have to get a lot worse before it will impose civilian allocations — an action that has been requested by certain industry representatives.

Office of Defense Mobilization thinking now is that although supplies are tight, defense orders take only about 10 pct of total production normally, and the impact of the strike so far isn't serious enough to require setting the involved rationing machinery in operation.

COPPER . . . Marketwise the situation gets worse every day for copper consumers so long as the strike continues. And even if the strike is settled this week, there's no replacing the copper that has already been lost.

London market has been on the rise, anticipating that the U. S. will have to keep on buying from Europe because of the severe shortage of the metal. At the end of week, copper on the London Metal Exchange was being quoted at $43.63.

And as was the case last week, a major producer of brass and bronze ingots upped its prices 1¢ per lb. Other producers followed suit. The increase was attributed to the higher cost of scrap.

Latest statistics from the Copper Institute show that production of both primary and refined copper declined during June. Primary output amounted to 91,458 tons, down more than 3500 tons from May. And the daily output rate of 3049 was the lowest since January of this year.

Secondary output amounted to 11,302 tons, compared with 11,731 in May. Production of refined copper in May was figured at 131,431 tons, compared with 135,042 in the previous month.

ALUMINUM . . . Labor is beginning to loom larger in the aluminum picture too, as the July 31 strike deadline draws nearer. Wage talks between Alcoa and the United Steelworkers and AFL Aluminum Workers have already started. Reynolds was due to begin its negotiations this week.

Here are some of the demands the Aluminum Workers union made during initial talks: (1) freeze the present 2¢ an hour cost of living bonus into the base rate, (2) change the cost of living clause to provide for a 1¢ an hour pay increase each time the government's cost of living index goes up five-tenths of a percentage point. Under the present contract a 1¢ increase is given for each six-tenths of percentage point gain in the government index. (3) The union also asked for a 6¢ an hour yearly wage increase based on productivity. Currently the union gets a 5¢ productivity pay hike each year.

Price of both aluminum scrap and smelters' ingot prices advanced during the week.

Latest statistics from Aluminum Assn. show production of primary aluminum is continuing at its record pace. Output during June amounted to 127,633 tons, bringing total for the year through June to 759,867 tons, a record for the first half of any year.

Second quarter production total ended up at 385,154 tons, another record.

Government last week cut the aluminum export scrap quota for the third quarter to 5000 tons. This is reduction of 4000 tons from the quota level in effect during the second quarter.

LEAD, ZINC . . . Demand for both metals continues good, although lead sales would undoubtedly have been higher were it not for the strike at plants of American Smelting & Refining Co. Calls for Special High Grade zinc are still running far in excess of supply.

Daily Nonferrous Metal Prices

(Cents per lb except as noted)

	July 13	July 14	July 15	July 16	July 18	July 19
Copper, electro, Conn.	36.00	36.00	36.00	36.00	36.00	36.00
Copper, Lake, delivered	36.00	36.00	36.00	36.00	36.00	36.00
Tin, Straits, New York	96.25	96.50	96.875	....	97.875	97.875*
Zinc, East St. Louis	12.50	12.50	12.50	12.50	12.50	12.50
Lead, St. Louis	14.80	14.80	14.80	14.80	14.80	14.80

Note: Quotations are going prices **Tentative*

. . . on the other hand, there are times when 1 head is better than 10

"Personally conducted tour" . . . that's exactly what your order gets, on its way through the Bristol mills. *One man* takes it from mail or phone straight through to box car or one of Bristol's own trailer rigs that serve a 250-mile radius overnight – So your order does no "desk-hopping" . . . keeps steadily on the move . . . gets on its way to you before bigger organizations could finish processing the paperwork.

But how does a middle-size mill do such a king-size job? Because, here at Bristol, there's no long "chain of command" . . . just a top team of responsible men, *experienced both in mill and sales procedure* who *have* the authority as well as the ability to get things done the "quickest way". And Bristol mill men will respect your specs to the dot . . . see to it that your successive orders are identical both dimensionally and physically. The burden of proof is on us . . . so call Bristol, Conn. (Ludlow 3-9246) or your nearest Bristol Brass distributor . . . *today.*

THE BRISTOL BRASS CORPORATION has been making Brass strip, rod and wire here in Bristol, Connecticut since 1850, and has offices and warehouses in Albany, Boston, Buffalo, Chicago, Cleveland, Detroit, Milwaukee, New York, Philadelphia, Providence, Rochester, Syracuse. The Bristol Brass Corporation of California, 1217 East 6th St., Los Angeles 21. The Bristol Brass Corporation of Ohio, 1607 Broadway, Dayton.

And now . . . BRASS FORGINGS, too . . .
The Bristol Brass Corporation announces the acquisition of Accurate Brass Company, 73rd Ave. & 88th St., Brooklyn 27, New York.
"How do you know it can't be forged?"

"Bristol-Fashion"
means **Brass at its Best**

Nonferrous Prices *(Effective July 19, 1955)*

MILL PRODUCTS

(Cents per lb, unless otherwise noted)

Aluminum

(Base 30,000 lb, f.o.b. ship. pt., frt. allowed)

Alloy	Flat Sheet			Plate
	0.032 in.	0.081 in.	0.136-0.249 in.	0.250-3.000 in.
1100, 3003	39.1	37.1	35.9	35.5
3004	44.0	39.8	38.1	37.6
5052	46.7	41.9	40.2	39.8
2024-O, -OAL	49.4	40.8	39.5	39.4
7075-O, -OAL	60.8	49.1	46.8	46.8

Extruded Solid Shapes: Shape factors 1 to 6, 38.7¢ to 66.7¢; 12 to 14, 39.4¢ to $1.04; 24 to 28, 42.2¢ to $1.85; 36 to 38, 49.8¢ to $1.97.

Rod, Round: Rolled, 1.064-4-5 in., 1100-F, 48.6¢ to 40.1¢; cold finished, 0.375-3.499 in., 1100-F, 47.9¢ to 42.4¢.

Screw Machine Stock: Rounds, 2011-T3, ⅛-11/32 in., 65.5¢ to 50.1¢; ⅜-1½ in., 49.9¢ to 46.9¢; 1 9/16-3 in., 45.7¢ to 42.7¢. Base 5000 lb.

Drawn Wire: Coiled, 0.051-0.374 in., 1100, 47.1¢ to 35.5¢; 5052, 56.7¢ to 44.4¢; 2017-T4, 64.5¢ to 44.7¢; 6061-T4, 59.5¢ to 44.1¢.

Extruded Tubing: Rounds, 6063-T5, OD 1¼-2 in., 44.4¢ to 64.5¢; 2-4 in., 40.3¢ to 54.6¢; 4-6 in., 49.5¢ to 49.8¢; 6-9 in., 41.4¢ to 52.1¢.

Roofing sheet: Flat, per sheet, 0.032-in., 42⅝ x 60-in., $2.995; x 96-in., $4.801; x 120-in., $6.002; x 144-in., $7.202. Coiled sheet, per lb, 0.019 in. x 28 in., 30.9¢.

Magnesium

(F.o.b. mill, freight allowed)

Sheet & Plate: FS1-O ¼ in., 59¢; 3/16 in., 60¢; ½ in., 59¢; 0.064 in., 76¢; 0.032 in., 97¢. Specification grade higher. Base, 30,000 lb.

Extruded Round Rod: M, diam ¼ to 0.311 in., 79¢; ½ to ⅝ in., 62.5¢; 1¼ to 1.749 in., 59¢; 2½ to 5 in., 54.5¢. Other alloys higher. Base up to ⅝ in. diam, 10,000 lb; ⅝ to 2 in., 20,000 lb; 2 in. and larger, 30,000 lb.

Extruded Solid Shapes: Rectangles: M. In weight per ft for perimeters less than size indicated: 0.10 to 0.11 lb, 2.5 in., 67.3¢; 0.22 to 0.25 lb, 5.9 in., 64.5¢; 0.50 to 0.59 lb, 8.6 in., 61.7¢; 1.8 to 2.59 lb, 19.5 in., 59.5¢; 4 to 6 lb, 28 in., 55¢. Other alloys higher. Base, in weight per ft of shape: Up to ½ lb, 10,000 lb; ¼ to 1.80 lb, 20,000 lb; 1.80 lb and heavier, 30,000 lb.

Extruded Round Tubing: M, 0.049 to 0.057 in. wall thickness: OD ⅛ to 5/16 in., $1.46; 5/16 to ⅝ in., $1.32; ½ to ⅝ in., 99¢; 1 to 2 in., 82¢; 0.165 to 0.219 in. wall: OD, ⅝ to ⅞ in., 67¢; 1 to 2 in., 63¢; 3 to 4 in., 62¢. Other alloys higher. Base OD: Up to 1½ in., 10,000 lb; 1½ to 3 in., 20,000 lb; over 3 in., 30,000 lb.

Titanium

(10,000 lb base, f.o.b. mill)

Sheet and strip, commercially pure, $14.00-$14.50; alloy $16.50; Plate, HR, commercially pure, $11.50-$12.00; alloy, $12.50-$12.75; Wire, rolled and/or drawn, commercially pure, $10.50-$11.00; alloy, $12.50; Bar, HR or forged, commercially pure, $8.50-$8.75; alloy, $8.50-$9.00.

Nickel, Monel, Inconel

(Base prices, f.o.b. mill)

	"A" Nickel	Monel	Inconel
Sheet, CR	102	78	89
Strip, CR	102	87	125
Rod, Bar, HR	87	69	93
Angles, HR	87	69	93
Plate, HR	97	82	95
Seamless Tube	122	108	153
Shot, Blocks		85	

Copper, Brass, Bronze

(Freight included on 500 lb)

	Sheet	Rods	Extruded Shapes
Copper	52.79		54.56
Copper, h-r	54.76	51.11	
Copper, drawn		52.36	
Low brass	49.75	49.69	
Yellow brass	46.37	46.21	
Red brass	50.99	50.93	
Naval brass		44.30	45.56
Leaded brass			43.09
Com. bronze	52.78	52.72	
Mang. bronze	53.73	47.83	49.39
Phos. bronze	73.03	73.53	
Munts metal	43.14	43.95	45.20
Ni silver, 10 pct	60.20	63.28	66.34

Beryllium copper, CR, 1.9% Be, Base 2000 lb, f.o.b.

Strip	$1.74
Rod, bar, wire	1.71

PRIMARY METALS

(Cents per lb, unless otherwise noted)

Aluminum ingot, 99+%, 10,000 lb, freight allowed	22.20
Aluminum pig	21.50
Antimony, American, Laredo, Tex.	28.50
Beryllium copper, per lb conta'd Be	$40.00
Beryllium aluminum 5% Be, Dollars per lb contained Be	$72.75
Bismuth, ton lots	$2.25
Cadmium, del'd	$1.70
Cobalt, 97-99% (per lb)	$2.60 to $2.67
Copper, electro, Conn. Valley	36.00
Copper, Lake, delivered	36.00
Gold, U. S. Treas., per troy oz.	$35.00
Indium, 99.8%, dollars per troy oz.	$2.25
Iridium, dollars per troy oz.	$90 to $100
Lead, St. Louis	14.80
Lead, New York	15.00
Magnesium, 99.8+%, f.o.b. Freeport, Tex., 10,000 lb, pig	28.50
ingot	29.25
Magnesium, sticks, 100 to 500 lb	49.00
Mercury, dollars per 76-lb flask, f.o.b. New York	$269
Nickel electro, f.o.b. N. Y. warehouse	67.67
Nickel oxide sinter, at Copper Cliff, Ont., contained nickel	66.75
Palladium, dollars per troy oz.	$20 to $21
Platinum, dollars per troy oz.	$77 to $80
Silver, New York, cents per troy oz.	90.75
Tin, New York	97.875
Titanium, sponge, grade A-1	$2.95
Zinc, East St. Louis	12.50
Zinc, New York	13.00
Zirconium, sponge	$10.00

REMELTED METALS

Brass Ingot

(Cents per lb delivered, carloads)

85-5-5-5 ingot	
No. 115	37.50
No. 120	37.00
No. 123	36.50
80-10-10 ingot	
No. 305	40.75
No. 315	39.00
88-10-2 ingot	
No. 210	52.25
No. 215	48.25
No. 245	42.75
Yellow ingot	
No. 405	31.75
Manganese bronze	
No. 421	34.75

Aluminum Ingot

(Cents per lb del'd 30,000 lb and over)

95-5 aluminum-silicon alloys	
0.30 copper, max.	28.75-29.50
0.60 copper, max.	28.50-29.25
Piston alloys (No. 122 type)	28.50-29.75
No. 12 alum. (No. 2 grade)	26.50-27.25
108 alloy	27.00-27.75
195 alloy	28.00-29.25
13 alloy (0.60 copper max.)	28.50-29.25
ASX-675	27.00-27.75

Steel deoxidizing aluminum, notch bar granulated or shot

Grade 1—95-97½%	27.00-28.00
Grade 2—92-95%	26.00-27.00
Grade 3—90-92%	25.00-26.00
Grade 4—85-90%	24.25-24.75

ELECTROPLATING SUPPLIES

Anodes

(Cents per lb, freight allowed, 5000 lb lots)

Copper	
Cast, oval, 15 in. or longer	44.92
Electrodeposited	39.78
Flat rolled	45.42
Brass, 80-20	
Cast, oval, 15 in. or longer	43.515
Zinc, flat cast	20.25
Ball, anodes	18.50
Nickel, 99 pct plus	
Cast	90.50*
Cadmium	$1.70
Silver 999 fine, rolled, 100 oz. lots per troy oz., f.o.b. Bridgeport, Conn.	94⅛

Chemicals

(Cents per lb, f.o.b. shipping points)

Copper cyanide, 100 lb drum	63.00
Copper sulphate, 99.5 crystals, bbl.	12.85
Nickel salts, single or double, 4-100 lb bags, frt. allowed	31.25*
Nickel chloride, 300 to 400 lb	43.50*
Silver cyanide, 100 oz. lots, per oz.	75⅛
Sodium cyanide, 96 pct domestic 200 lb drums	19.25
Zinc cyanide, 100 lb drum	54.30

* Effective Jan. 3.

SCRAP METALS

Brass Mill Scrap

(Cents per pound, add 1¢ per lb for shipments of 20,000 lb and over)

	Heavy	Turnings
Copper	32	31¼
Yellow brass	23⅜	22
Red brass	28⅛	27⅝
Comm. bronze	29⅛	28½
Mang. bronze	22 1/6	21⅝
Yellow brass rod ends	23⅝	22

Custom Smelters Scrap

(Cents per pound carload lots, delivered to refinery)

No. 1 copper wire	37½
No. 2 copper wire	36
Light copper	34¼
*Refinery brass	33

* Dry copper content.

Ingot Makers Scrap

(Cents per pound carload lots, delivered to refinery)

No. 1 copper wire	37½
No. 2 copper wire	36
Light copper	34¼
No. 1 composition	31
No. 1 comp. turnings	30½
Rolled brass	23½—24
Brass pipe	24¼—24½
Radiators	23½—24
Aluminum	
Mixed old cast	17½—18½
Mixed new clips	19 —20
Mixed turnings, dry	17½—19

Dealers' Scrap

(Dealers' buying prices, f.o.b. New York in cents per pound)

Copper and Brass	
No. 1 heavy copper and wire	33½—34
No. 2 heavy copper and wire	32½—33
Light copper	30½—31
New type shell cuttings	30½—31
Auto radiators (unsweated)	20½—21
No. 1 composition	27 —27½
No. 1 composition turnings	26½—27
Unlined red car boxes	20½—21
Cocks and faucets	21 —21½
Mixed heavy yellow brass	17 —17½
Old rolled brass	20 —20½
Brass pipe	21 —21½
New soft brass clippings	22½—23
Brass rod ends	21½—22
No. 1 brass rod turnings	20½—21
Aluminum	
Alum. pistons and struts	15 —15½
Aluminum crankcases	15 —15½
1100 (2S) aluminum clippings	17 —17½
Old sheet and utensils	15 —15½
Borings and turnings	9 —10
Misc. cast aluminum	15 —15½
2024 (24s) clippings	16 —16½
Zinc	
New zinc clippings	7 — 7½
Old Zinc	5 — 5½
Zinc routings	3½— 3¾
Old die cast scrap	3½— 3¾
Nickel and Monel	
Pure nickel clippings	85
Clean nickel turnings	70
Nickel anodes	85
Nickel rod ends	85
New Monel clippings	39 —42
Clean Monel turnings	29½
Old sheet Monel	34 —36
Nickel silver clippings, mixed	18½—19
Nickel silver turnings, mixed	16½—17
Lead	
Soft scrap lead	11½—12
Battery plates (dry)	6½— 6¾
Batteries, acid free	4¼
Magnesium	
Segregated solids	18½—19
Castings	17½—18
Miscellaneous	
Block tin	78 —80
No. 1 pewter	60 —61
No. 1 auto babbitt	50
Mixed common babbitt	14½
Solder joints	18 —19
Siphon tops	43
Small foundry type	15 —16
Monotype	14½—15
Lino. and stereotype	14 —14½
Electrotype	12 —12½
Hand picked type shells	10¾
Lino. and stereo. dross	5½
Electro dross	4½

IRON AGE

STEEL PRICES

(Effective July 19, 1955)

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		BILLETS, BLOOMS, SLABS			PILING	SHAPES STRUCTURALS			STRIP					
		Carbon Rerolling Net Ton	Carbon Forging Net Ton	Alloy Net Ton	Sheet Steel	Carbon	Hi Str. Low Alloy	Carbon Wide-Flange	Hot-rolled	Cold-rolled	Hi Str. H.R. Low Alloy	Hi Str. C.R. Low Alloy	Alloy Hot-rolled	Alloy Cold-rolled
EAST	Bethlehem, Pa.			$96.00 *B3*		4.65 *B3*	6.00 *B3*	4.65 *B3*						
	Buffalo, N. Y.	$68.50 *B3*	$84.50 *R3, B3*	$96.00 *R3, B3*	5.45 *B3*	4.65 *B3*	6.00 *B3*	4.65 *B3*	4.325 *R3,B3*	6.45 *B3* 6.25 *R7, S10*	6.425 *B3*	9.125 *B3*		
	Claymont, Del.													
	Harrison, N. J.													13.45 *C11*
	Conshohocken, Pa.								*A2*	*A2*	6.425 *A2*			
	New Bedford, Mass.									*R6*				
	Johnstown, Pa.	$68.50 *B3*	$84.50 *B3*	$96.00 *B3*		4.65 *B3*	6.00 *B3*							
	Boston, Mass.									*T8*				*T8*
	New Haven, Conn.									6.70 *D1* 7.20 *A5*				
	Phoenixville, Pa.					4.65 *P2*		4.65 *P2*						
	Sparrows Pt., Md.								4.325 *B3*	6.45 *T8,B3*	6.425 *B3*	9.125 *B3*		
	Bridgeport, Wallingford, Conn.	$73.50 *N8*	$89.50 *N8*						4.625 *N8*	*W1*			7.50 *N8*	
	Pawtucket, R. I. Worcester, Mass.									*N7* 7.30 *A5*				*A5 N7*
MIDDLE WEST	Alton, Ill.								4.50 *L1*					
	Ashland, Ky.								4.325 *A7*					
	Canton-Massillon, Dover, Ohio		$86.50 *R3*	$96.00 *R3*										13.45 *G4*
	Chicago, Ill.	$68.50 *U1*	$84.50 *R3, U1,W8*	$96.00 *R3, U1,W8*	5.45 *U1*	4.60 *U1, W8*	6.75 *U1, Y1*	4.60 *U1*	4.325 *A1, N4,W8*	6.35 *A1,T8*			7.20 *W8*	13.45 *T8*
	Cleveland, Ohio									6.45 *A5,J3*		9.30 *A5*		13.45 *A5*
	Detroit, Mich.			$96.00 *R5*					4.425 *G3,M2*	6.35 *D1,D2, G3,M2,P11*	6.525 *G3*	9.20 *D2, G3*		
	Duluth, Minn.													
	Gary, Ind. Harbor, Indiana	$68.50 *U1*	$84.50 *U1*	$96.00 *U1, Y1*	5.45 *I3*	4.60 *U1, I3*	6.75 *U1, I3*		4.325 *I3, U1,Y1*	*I3*	6.425 *I3, U1,Y1*	9.30 *Y1*	7.20 *Y1, U1*	
	Sterling, Ill.								*N4*					
	Indianapolis, Ind.									*C5*				
	Newport, Ky.												7.20 *N5*	
	Middletown, Ohio									*A7*				
	Niles, Warren, Ohio Sharon, Pa.	$68.50 *C10*	$84.50 *C10*	$96.00 *C10*					4.325 *S1, R3*	6.25 *S1, R3,T4*	6.425 *S1, R3*	9.10 *S1, R3*	7.20 *S1*	13.45 *S1*
	Pittsburgh, Pa. Midland, Pa. Butler, Pa.	$68.50 *U1, J3*	$84.50 *J3, U1,C11*	$96.00 *U1, C11*	5.45 *U1*	4.60 *U1, J3*	6.75 *U1, J3*	4.60 *U1*	4.325 *P6*	6.25 *S7,B4*			7.20 *S9*	*S9*
	Portsmouth, Ohio								4.325 *P7*	6.25 *P7*				
	Weirton, Wheeling, Follansbee, W. Va.					4.60 *W3*			4.325 *W3*	6.25 *F3,W3*	6.425 *W3*	9.10 *W3*		
	Youngstown, Ohio		$84.50 *C10*	$96.00 *Y1, C10*		4.60 *Y1*	6.75 *Y1*		4.325 *U1, Y1*	6.45 *Y1,C5*	6.425 *U1, Y1*	9.30 *Y1*	7.20 *U1, Y1*	13.45 *C5*
WEST	Fontana, Cal.	$76.00 *K1*	$92.00 *K1*	$115.00 *K1*		5.25 *K1*	7.40 *K1*	5.40 *K1*	50.75 *K1*	8.20 *K1*	7.525 *K1*		8.85 *K1*	
	Geneva, Utah		$84.50 *C7*			4.60 *C7*	6.75 *C7*							
	Kansas City, Mo.					4.70 *S2*	6.85 *S2*				6.675 *S2*		7.42 *S2*	
	Los Angeles, Torrance, Cal.		$94.00 *B2*	$116.00 *B2*		5.30 *C7, B2*	7.45 *B2*		5.075 *C7, B2*	8.50 *C1*			8.40 *B2*	
	Minnequa, Colo.					4.90 *C6*			5.425 *C6*					
	Portland, Ore.					5.35 *O2*								
	San Francisco, Niles, Pittsburg, Cal.		$94.00 *B2*			5.25 *B2 P9*	7.40 *B2*		5.075 *B2, C7*					
	Seattle, Wash.		$98.00 *B2*			5.35 *B2*	7.50 *B2*		*B2*					
SOUTH	Atlanta, Ga.								4.525 *A8*					
	Fairfield, Ala. City, Birmingham, Ala.	$68.50 *T2*	$84.50 *T2*			4.60 *C16, R3,T2*	6.75 *T2*		4.325 *R3, C16,T2*		6.425 *T2*			
	Houston, Lone Star, Tex.	*L3*	$89.50 *S2*	$101.00 *S2*		4.70 *S2*	6.85 *S2*				6.875 *S2*		7.40 *S2*	

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		SHEETS									WIRE ROD	TINPLATE†		BLACK PLATE
		Hot-rolled 18 ga. & hvyr.	Cold-rolled	Galvanized 10 ga.	Enameling 12 ga.	Long Terne 10 ga.	Hi Str. Low Alloy H.R.	Hi Str. Low Alloy C.R.	Hi Str. Low Alloy Galv.	Hot-rolled 19 ga.		Cokes* 1.25-lb. base box	Electro* 0.25-lb. base box	Hollowware Enameling 29 ga.
EAST	Bethlehem, Pa.													
	Buffalo, N. Y.	4.325 *B3*	5.325 *B3*				6.375 *B3*	7.875 *B3*			*W6*	† Special coated mfg. terne deduct 95¢ from 1.25-lb coke base box price. Can-making quality blackplate 55 to 128 lb. deduct $2.20 from 1.25-lb. coke base box. * COKES: 1.50-lb. add 25¢. ELECTRO: 0.50-lb. add 25¢; 0.75-lb. add 65¢; 1.00-lb. add $1.10. Differential 1.00 lb./0.25 lb. add 85¢.		
	Claymont, Del.													
	Centreville, Pa.													
	Conshohocken, Pa.	4.375 *A2*	5.375 *A2*				6.425 *A2*							
	Harrisburg, Pa.													
	Hartford, Conn.													
	Johnstown, Pa.										5.025 *B1*			
	Fairless, Pa.	4.375 *U1*	5.375 *U1*				6.425 *U1*	7.925 *U1*				$8.90 *U1*	$7.60 *U1*	
	New Haven, Conn.													
	Phoenixville, Pa.													
	Sparrows Pt., Md.	4.325 *B3*	5.325 *B3*	5.85 *B3*			6.375 *B3*	7.875 *B3*	8.60 *B3*		5.125 *B3*	$8.90 *B3*	$7.60 *B3*	
	Worcester, Mass.										5.325 *A5*			
	Trenton, N. J.													
MIDDLE WEST	Alton, Ill.										5.20 *L1*			
	Ashland, Ky.	4.325 *A7*		5.85 *A7*	5.90 *A7*									
	Canton-Massillon, Dover, Ohio			5.85 *R1, R3*										
	Chicago, Joliet, Ill.	4.325 *A1, W8*					6.375 *U1*				5.025 *A5, N4, R3*			
	Sterling, Ill.										5.125 *N4*			
	Cleveland, Ohio	4.325 *J3, R3*	5.325 *J3, R3*		5.90 *R3*		6.375 *J3, R3*	7.875 *J3, R3*			5.025 *A5*			
	Detroit, Mich.	4.425 *G3, M2*	5.425 *G3, M2*				6.475 *G3*	7.975 *G3*						
	Newport, Ky.	4.325 *N5*	5.325 *N5*	5.85 *N5*										
	Gary, Ind. Harbor, Indiana	4.325 *I3, U1, Y1*	5.325 *I3, U1, Y1*	5.85 *U1, I3*	5.90 *U1, I3*	6.25 *U1*	6.375 *Y1, U1, I3*	7.875 *U1, Y1*			*Y1*	$8.80 *I3, U1, Y1*	$7.50 *I3, U1, Y1*	6.65 *U1, Y1*
	Granite City, Ill.	4.525 *G2*	5.525 *G2*	6.05 *G2*	6.10 *G2*								$7.60 *G2*	6.75 *G2*
	Kokomo, Ind.	4.425 *C9*		5.95 *C9*						5.475 *C9*	5.125 *C9*			
	Mansfield, Ohio	4.325 *E2*	5.325 *E2*			6.25 *E2*				*E2*				
	Middletown, Ohio		5.325 *A7*	5.85 *A7*	5.90 *A7*	6.25 *A7*								
	Niles, Warren, Ohio Sharon, Pa	4.325 *S1, R3 N3*	5.325 *R3 N3*	5.85 *N3, R3*	5.90 *N3*	6.25 *N3*	6.375 *S1, R3*	7.875 *R3*				$8.80 *R3*	$7.50 *R3,*	
	Pittsburgh, Pa. Midland, Pa. Butler, Pa.	4.325 *J3, U1, P6*	5.325 *J3, U1, P6*	5.85 *U1*	5.90 *U1, A7*		6.375 *J3, U1*	7.875 *U1*	8.60 *U1*		5.025 *A5 P6*	$8.80 *J3, U1*	$7.50 *J3, U1*	6.65 *U1*
	Portsmouth, Ohio	4.325 *P7*	5.325 *P7*								5.025 *P7*			
	Weirton, Wheeling, Follansbee, W. Va.	4.325 *W3, W1*	5.325 *W3, W5, F3*	5.85 *W3, W1*		6.25 *W3, W5*	6.375 *W3*	7.875 *W3*				$8.80 *W3, W5*	$7.50 *W3, W5*	6.65 *F3, W5*
	Youngstown, Ohio	4.325 *U1, Y1*	5.325 *Y1*		5.90 *Y1*		6.375 *U1, Y1*	7.875 *Y1*						
WEST	Fontana, Cal.	5.075 *K1*	6.425 *K1*				7.125 *K1*	8.975 *K1*			*K1*			
	Geneva, Utah	4.425 *C7*												
	Kansas City, Mo.										5.275 *S2*			
	Los Angeles, Torrance, Cal.										5.825 *B2*			
	Minnequa, Colo.										5.275 *C6*			
	San Francisco, Niles, Pittsburg, Cal.	5.025 *C7*	6.275 *C7*	6.60 *C7*							5.675 *C7*	$9.55 *C7*	$8.25 *C7*	
	Seattle, Wash													
SOUTH	Atlanta, Ga.													
	Fairfield, Ala. Alabama City, Ala.	4.325 *R3, T2*	5.325 *T2*	5.85 *R3, T2*			6.375 *T2*			5.625 *R3*	5.625 *R3, T2*	$8.90 *T2*	$7.60 *T2*	
	Houston, Tex.										5.275 *S2*			

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		BARS						PLATES				WIRE
		Carbon Steel	Reinforcing	Cold Finished	Alloy Hot-rolled	Alloy Cold Drawn	Hi Str. H.R. Low Alloy	Carbon Steel	Floor Plate	Alloy	Hi Str. Low Alloy	Mfr's. Bright
EAST	Bethlehem, Pa.				5.575 *B3*	7.425 *B3*	6.00 *B3*					
	Buffalo, N. Y.	4.65 *B3,R3*	4.65 *B3,R3*	5.95 *B5*	5.575 *B3,R3,*	7.425 *B3,B5*	6.00 *B3*	4.50 *B3,R3*				6.25 *W6*
	Claymont, Del.							4.50 *C4*		6.30 *C4*		
	Coatesville, Pa.							4.50 *L4*		6.30 *L4*	6.725 *L4*	
	Conshohocken, Pa.							4.50 *A2*	5.575 *A2*		6.725 *A2*	
	Harrisburg, Pa.							4.50 *C3*	5.575 *C3*			
	Hartford, Conn.			6.40 *R3*		7.725 *R3*						
	Johnstown, Pa.	4.65 *B3*	4.65 *B3*		5.575 *B3*		6.00 *B3*	4.50 *B3*		6.30 *B3*	6.725 *B3*	6.25 *B3*
	Fairless, Pa.	4.80 *U1*	4.80 *U1*		5.725 *U1*							
	Newark, N. J.			6.35 *W10*		7.60 *W10*						
	Camden, N. J.			6.35 *P10*								
	Bridgeport, Putnam, Conn.	4.90 *N8*		6.45 *W10*	5.725 *N8*			*N8*				
	Sparrows Pt., Md.		4.65 *B3*					4.50 *B3*		6.30 *B3*	6.725 *B3*	6.35 *B3*
	Palmer, Worcester, Readville, Mansfield, Mass.			6.35 *W11* 6.45 *B5,C14*		7.725 *A5,B5*		4.50 *R3*				6.55 *A5, W6*
MIDDLE WEST	Alton, Ill.	4.85 *L1*										6.425 *L1*
	Ashland,Newport,Ky.							4.50 *A7,N5*		6.30 *N5*		
	Canton-Massillon, Mansfield, Ohio	4.75 *R3*		5.90 *R2,R3*	5.575 *R3,T5*	7.425 *R2,R3, T5*		4.50 *E2*				
	Chicago, Joliet, Ill.	4.65 *U1, N4,W8,R3, P13*	4.65 *N4,R3, P13*	5.90 *A5,W10, W8,B5,L2*	5.575 *U1,R3, W8*	7.425 *A5,W8, W10,L2,B5*		4.50 *U1,W8, I3,A1,R3*	5.575 *U1*	6.30 *U1*	6.725 *U1*	6.25 *A5, R3,N4,W7*
	Cleveland, Ohio	4.65 *R3*	4.65 *R3*	5.90 *A5,C13*		7.425 *A5,C13*	6.00 *R3*	4.50 *R3* 4.60 *J3*	5.575 *J3*		6.00 *R3 J3*	6.25 *A5, C13*
	Detroit, Mich.	4.75 *G3*	4.75 *G3*	5.90 *R5* 6.10 *B5,P8* 6.15 *P3*	5.575 *R5* 5.675 *G3*	7.425 *R5* 7.525 *B5,P3 P8*	6.90 *G3*	4.60 *G3*			6.825 *G3*	
	Duluth, Minn.											6.25 *A5*
	Gary, Ind. Harbor, Crawfordsville	4.65 *I3, U1, Y1*	4.65 *I3, U1, Y1*	5.90 *M5,R3*	5.575 *I3, U1, Y1*	7.425 *M5, R3*	6.00 *U1,I3, Y1*	4.50 *I3, U1,Y1*	5.575 *I3*	6.30 *U1,Y1*	6.725 *U1,I3, Y1*	6.35 *M4*
	Granite City, Ill.							4.70 *G2*				
	Kokomo, Ind.											6.35 *C9*
	Sterling, Ill.	4.75 *N4*	4.75 *N4*									6.35 *N4*
	Niles, Warren, Ohio Sharon, Pa.	4.65 *R3,C10*		5.90 *C10*	5.575 *C10*	7.425 *C10*	6.00 *R3*	4.50 *S1,R3*		6.30 *S1*	6.725 *S1*	
	Pittsburgh, Pa. Midland, Pa.	4.65 *J3, U1, C11*	4.65 *J3, U1*	5.90 *A5,C8, C11,J3, W10,B4,R3*	5.575 *U1,C11*	7.425 *A5,C11, W10,C8,R3*	6.00 *J3, U1*	4.50 *J3, U1*	5.575 *U1*	6.30 *U1*	6.725 *J3, U1*	6.25 *A5,J3, P6*
	Portsmouth, Ohio											6.25 *P7*
	Weirton, Wheeling, Follansbee, W. Va.	4.65 *W3*						4.50 *W3,W5*				
	Youngstown, Ohio	4.65 *U1,Y1, C10,R3*	4.65 *U1,Y1, R3*	5.90 *Y1, U1*	5.575 *U1,Y1, C10*	7.425 *Y1,C10* 7.665 *F2*	6.00 *U1,Y1*	4.50 *U1,Y1, R3*		6.30 *Y1*	6.725 *Y1*	6.25 *Y1*
WEST	Emeryville, Cal.	5.40 *J5*	5.40 *J5*									
	Fontana, Cal.	5.35 *K1*	5.35 *K1*		6.625 *K1*		7.50 *K1*	5.15 *K1*		6.95 *K1*	7.375 *K1*	
	Geneva, Utah							4.50 *C7*			6.725 *C7*	
	Kansas City, Mo.	4.90 *S2*	4.90 *S2*		5.875 *S2*		7.05 *S2*					6.50 *S2*
	Los Angeles, Torrance, Cal.	5.35 *B2,C7*	5.35 *B2,C7*	7.35 *R3*	6.625 *B2*		7.50 *B2*				7.625 *B2*	7.20 *B2*
	Minnequa, Colo.	5.10 *C6*	5.10 *C6*					5.35 *C6*				6.50 *C6*
	Portland, Ore.	5.40 *O2*	5.40 *O2*									
	San Francisco, Niles, Pittsburg, Cal.	5.35 *C7* 5.40 *B2,P9*	5.35 *C7* 5.40 *B2,P9*				7.55 *B2*					7.20 *C7*
	Seattle, Wash.	5.40 *B2,P12, N6*	5.40 *B2,P12*				7.55 *B2*	5.40 *B2*		7.20 *B2*	7.625 *B2*	
SOUTH	Atlanta, Ga.	4.85 *A8*	4.85 *A8*									6.45 *A8*
	Fairfield, Ala. City, Birmingham, Ala.	4.65 *T2,C16, R3*	4.65 *T2,C16, R3*				6.80 *T2*	4.50 *T2,R3*			6.725 *T2*	6.25 *R3, T2*
	Houston, Ft. Worth, Lone Star, Tex.	4.90 *S2*	4.90 *S2*		5.825 *S2*		7.05 *S2*	4.60 *L3, S2*		6.40 *S2*	6.825 *S3*	6.50 *S2*

Steel Prices *(Effective July 19, 1955)*

Key to Steel Producers

With Principal Offices

A1 Acme Steel Co., Chicago
A2 Alan Wood Steel Co., Conshohocken, Pa.
A3 Allegheny Ludlum Steel Corp., Pittsburgh
A4 American Cladmetals Co., Carnegie, Pa.
A5 American Steel & Wire Div., Cleveland
A6 Angell Nail & Chaplet Co., Cleveland
A7 Armco Steel Corp., Middletown, O.
A8 Atlantic Steel Co., Atlanta, Ga.

B1 Babcock & Wilcox Tube Div., Beaver Falls, Pa.
B2 Bethlehem Pacific Coast Steel Corp., San Francisco
B3 Bethlehem Steel Co., Bethlehem, Pa.
B4 Blair Strip Steel Co., New Castle, Pa.
B5 Bliss & Laughlin, Inc., Harvey, Ill.
B6 Brook Plant, Wickwire Spencer Steel Div., Birdsboro, Pa.

C1 Calstrip Steel Corp., Los Angeles
C2 Carpenter Steel Co., Reading, Pa.
C3 Central Iron & Steel Co., Harrisburg, Pa.
C4 Claymont Products Dept., Claymont, Del.
C5 Cold Metal Products Co., Youngstown, O.
C6 Colorado Fuel & Iron Corp., Denver
C7 Columbia Geneva Steel Div., San Francisco
C8 Columbia Steel & Shafting Co., Pittsburgh
C9 Continental Steel Corp., Kokomo, Ind.
C10 Copperweld Steel Co., Pittsburgh, Pa.
C11 Crucible Steel Co. of America, Pittsburgh
C12 Cumberland Steel Co., Cumberland, Md.
C13 Cuyahoga Steel & Wire Co., Cleveland
C14 Compressed Steel Shafting Co., Readville, Mass.
C15 G. O. Carlson, Inc., Thorndale, Pa.
C16 Connors Steel Div., Birmingham
C17 Chester Blast Furnace Inc., Chester, Pa.

D1 Detroit Steel Corp., Detroit
D2 Detroit Tube & Steel Div., Detroit
D3 Driver Harris Co., Harrison, N. J.
D4 Dickson Weatherproof Nail Co., Evanston, Ill.
D5 Henry Disston & Sons, Inc., Philadelphia

E1 Eastern Stainless Steel Corp., Baltimore
E2 Empire Steel Co., Mansfield, O.

F1 Firth Sterling, Inc., McKeesport, Pa.
F2 Fitzsimmons Steel Corp., Youngstown
F3 Follansbee Steel Corp., Follansbee, W. Va.

G1 Globe Iron Co., Jackson, O.
G2 Granite City Steel Co., Granite City, Ill.
G3 Great Lakes Steel Corp., Detroit
G4 Greer Steel Co., Dover, O.

H1 Hanna Furnace Corp., Detroit

I2 Ingersoll Steel Div., Chicago
I3 Inland Steel Co., Chicago
I4 Interlake Iron Corp., Cleveland

J1 Jackson Iron & Steel Co., Jackson, O.
J2 Jessop Steel Corp., Washington, Pa.
J3 Jones & Laughlin Steel Corp., Pittsburgh
J4 Joslyn Mfg. & Supply Co., Chicago
J5 Judson Steel Corp., Emeryville, Calif.

K1 Kaiser Steel Corp., Fontana, Cal.
K2 Keystone Steel & Wire Co., Peoria
K3 Koppers Co., Granite City, Ill.

L1 Laclede Steel Co., St. Louis
L2 La Salle Steel Co., Chicago
L3 Lone Star Steel Co., Dallas
L4 Lukens Steel Co., Coatesville, Pa.

M1 Mahoning Valley Steel Co., Niles, O.
M2 McLouth Steel Corp., Detroit
M3 Mercer Tube & Mfg. Co., Sharon, Pa.
M4 Mid-States Steel & Wire Co., Crawfordsville, Ind.
M5 Monarch Steel Div., Hammond, Ind.
M6 Mystic Iron Works, Everett, Mass.

N1 National Supply Co., Pittsburgh
N2 National Tube Div., Pittsburgh
N3 Niles Rolling Mill Div., Niles, O.
N4 Northwestern Steel & Wire Co., Sterling, Ill.
N5 Newport Steel Corp., Newport, Ky.
N6 Northwest Steel Rolling Mills, Seattle
N7 Newman Crosby Steel Co., Pawtucket, R. I.
N8 Northeastern Steel Corp., Bridgeport, Conn.

O1 Oliver Iron & Steel Co., Pittsburgh
O2 Oregon Steel Mills, Portland

P1 Page Steel & Wire Div., Monessen, Pa.
P2 Phoenix Iron & Steel Co., Phoenixville, Pa.
P3 Pilgrim Drawn Steel Div., Plymouth, Mich.
P4 Pittsburgh Coke & Chemical Co., Pittsburgh
P5 Pittsburgh Screw & Bolt Co., Pittsburgh
P6 Pittsburgh Steel Co., Pittsburgh
P7 Portsmouth Div., Detroit Steel Corp., Detroit
P8 Plymouth Steel Co., Detroit
P9 Pacific States Steel Co., Niles, Cal.
P10 Precision Drawn Steel Co., Camden, N. J.
P11 Production Steel Strip Corp., Detroit
P12 Pacific Steel Rolling Mills, Seattle
P13 Phoenix Mfg. Co., Joliet, Ill.

R1 Reeves Steel & Mfg. Co., Dover, O.
R2 Reliance Div., Eaton Mfg. Co., Massillon, O.
R3 Republic Steel Corp., Cleveland
R4 Roebling Sons Co., John A., Trenton, N. J.
R5 Rotary Electric Steel Co., Detroit
R6 Rodney Metals, Inc., New Bedford, Mass.
R7 Rome Strip Steel Co., Rome, N. Y.

S1 Sharon Steel Corp., Sharon, Pa.
S2 Sheffield Steel Corp., Kansas City
S3 Shenango Furnace Co., Pittsburgh
S4 Simonds Saw & Steel Co., Fitchburg, Mass.
S5 Sweet's Steel Co., Williamsport, Pa.
S6 Standard Forging Corp., Chicago
S7 Stanley Works, New Britain, Conn.
S8 Superior Drawn Steel Co., Monaca, Pa.
S9 Superior Steel Corp., Carnegie, Pa.
S10 Seneca Steel Service, Buffalo

T1 Tonawanda Iron Div., N. Tonawanda, N. Y.
T2 Tennessee Coal & Iron Div., Fairfield
T3 Tennessee Products & Chem. Corp., Nashville
T4 Thomas Strip Div., Warren, O.
T5 Timken Steel & Tube Div., Canton, O.
T6 Tremont Nail Co., Wareham, Mass.
T7 Texas Steel Co., Fort Worth
T8 Thompson Wire Co., Boston

U1 United States Steel Corp., Pittsburgh
U2 Universal-Cyclops Steel Corp., Bridgeville, Pa.
U3 Ulbrich Stainless Steels, Wallingford, Conn.
U4 U. S. Pipe & Foundry Co., Birmingham

W1 Wallingford Steel Co., Wallingford, Conn.
W2 Washington Steel Corp., Washington, Pa.
W3 Weirton Steel Co., Weirton, W. Va.
W4 Wheatland Tube Co., Wheatland, Pa.
W5 Wheeling Steel Corp., Wheeling, W. Va.
W6 Wickwire Spencer Steel Div., Buffalo
W7 Wilson Steel & Wire Co., Chicago
W8 Wisconsin Steel Co., S. Chicago, Ill.
W9 Woodward Iron Co., Woodward, Ala.
W10 Wycoff Steel Co., Pittsburgh
W11 Worcester Pressed Steel Co., Worcester, Mass.

Y1 Youngstown Sheet & Tube Co., Youngstown

PIPE AND TUBING

Base discounts (pct) f.o.b. mills. Base price about $280 per net ton.

	BUTTWELD														SEAMLESS							
	½ In.		⅜ In.		1 In.		1¼ In.		1½ In.		2 In.		2½–3 In.		2 In.		2½ In.		3 In.		3½–4 In.	
STANDARD T. & C.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.
Sparrows Pt. *B3*	15.50	6.25	18.50	4.25	21.00	7.75	23.50	8.50	24.00	9.50	24.50	10.00	26.00	9.75								
Youngstown *R5*	17.50	2.25	20.50	6.25	23.00	9.75	25.50	10.50	26.00	11.50	26.50	12.00	28.00	11.75								
Fontana *K1*	4.50	+10.7	7.50	+6.75	10.00	+3.25	12.50	+2.50	13.00	+1.50	13.50	+1.00	15.00	+1.25								
Pittsburgh *J3*	17.50	2.25	20.50	6.25	23.00	9.75	25.50	10.50	26.00	11.50	26.50	12.00	28.00	11.75	6.50	+8.50	10.50	+6.25	13.00	+3.75	14.50	+2.25
Alton, Ill. *L1*	15.50	0.25	18.50	4.25	21.00	7.75	23.50	8.50	24.00	9.50	24.50	10.00	26.00	9.75								
Sharon *M3*	17.50	2.25	20.50	6.25	23.00	9.75	25.50	10.50	26.00	11.50	26.50	12.00	28.00	11.75								
Fairless *N2*	15.50	0.25	18.50	4.25	21.00	7.75	23.50	8.50	24.00	9.50	24.50	10.00	26.00	9.75								
Pittsburgh *N1*	17.50	2.25	20.50	6.25	23.00	9.75	25.50	10.50	26.00	11.50	26.50	12.00	28.00	11.75	6.50	+0.50	10.50	+6.25	13.00	+3.75	14.50	+2.25
Wheeling *W5*	17.50	2.25	20.50	6.25	23.00	9.75	25.50	10.50	26.00	11.50	26.50	12.00	28.00	11.75								
Wheatland *W4*	17.50	2.25	20.50	6.25	23.00	9.75	25.50	10.50	26.00	11.50	26.50	12.00	28.00	11.75								
Youngstown *Y1*	17.50	2.25	20.50	6.25	23.00	9.75	25.50	10.50	26.00	11.50	26.50	12.00	28.00	11.75	6.50	+8.50	10.50	+6.25	13.00	+3.75	14.50	+2.25
Indiana Harbor *Y1*	16.50	1.25	19.50	5.25	22.00	8.75	24.50	9.50	25.00	10.50	25.50	11.00	27.00	10.75								
Lorain *N2*	17.50	2.25	20.50	6.25	23.00	9.75	25.50	10.50	26.00	11.50	26.50	12.00	28.00	11.75	6.50	+8.50	10.50	+6.25	13.00	+3.75	14.50	+2.25
EXTRA STRONG PLAIN ENDS																						
Sparrows Pt. *B3*	20.0	6.25	24.00	10.25	26.00	13.75	26.50	12.50	27.00	13.50	27.50	14.00	28.00	12.75								
Youngstown *R5*	22.0	6.25	26.00	12.25	28.00	15.75	28.50	14.50	29.00	15.50	29.50	16.00	30.00	14.75								
Fairless *N2*	20.0	6.25	24.00	10.25	26.00	13.75	26.50	12.50	27.00	13.50	27.50	14.00	28.00	12.75								
Fontana *K1*	9.00	+4.75	13.00	+0.75	15.00	2.75	15.50	1.50	16.00	2.50	16.50	3.00	17.00	1.75								
Pittsburgh *J3*	22.0	6.25	26.00	12.25	28.00	15.75	28.50	14.50	29.00	15.50	29.50	16.00	30.00	14.75	8.00	+6.00	13.00	+2.75	15.50	+0.25	20.50	4.75
Alton, Ill. *L1*	20.0	6.25	24.00	10.25	26.00	13.75	26.50	12.50	27.00	13.50	27.50	14.00	28.00	12.75								
Sharon *M3*	22.0	6.25	26.00	12.25	28.00	15.75	28.50	14.50	29.00	15.50	29.50	16.00	30.00	14.75								
Pittsburgh *N1*	22.0	6.25	26.00	12.25	28.00	15.75	28.50	14.50	29.00	15.50	29.50	16.00	30.00	14.75	8.00	+6.00	13.00	+2.75	15.50	+0.25	20.50	4.75
Wheeling *W5*	22.0	6.25	26.00	12.25	28.00	15.75	28.50	14.50	29.00	15.50	29.50	16.00	30.00	14.75								
Wheatland *W4*	22.0	6.25	26.00	12.25	28.00	15.75	28.50	14.50	29.00	15.50	29.50	16.00	30.00	14.75								
Youngstown *Y1*	22.0	6.25	26.00	12.25	28.00	15.75	28.50	14.50	29.00	15.50	29.50	16.00	30.00	14.75	8.00	+6.00	13.00	+2.75	15.50	+0.25	20.50	4.75
Indiana Harbor *Y1*	21.0	7.25	25.00	11.25	27.00	14.75	27.50	13.50	28.00	14.50	28.50	15.00	29.00	13.75								
Lorain *N2*	22.0	6.25	26.00	12.25	28.00	15.75	28.50	14.50	29.00	15.50	29.50	16.00	30.00	14.75	8.00	+6.00	13.00	+2.75	15.50	+0.25	20.50	4.75

Threads only, buttweld and seamless 2½ pt higher discount. Plain ends, buttweld and seamless, 3-in. and under, 4½ pt higher discount. Buttweld jobbers discount, 5 pct.
Galvanized discounts based on zinc price range of over 9¢ to 11¢ per lb, East St. Louis. For each 2¢ change in zinc, discounts vary as follows: ½, ¾ and 1-in., 2 pt.; 1¼, 1½ and 2 in., 1½ pt.; 2½ and 3-in., 1 pt. e.g., zinc price range of over 11¢ to 13¢ would lower discounts; zinc price in range of over 7¢ to 9¢ would increase discounts. East St. Louis zinc price now 12.50¢ per lb.

Steel Prices *(Effective July 19, 1955)*

To identify producers, see Key on preceding page.

RAILS, TRACK SUPPLIES

F.o.b. Mill Cents Per Lb	No. 1 Std. Rails	Light Rails	Joint Bars	Track Spikes	Screw Spikes	Tie Plates	Track Bolts Treated
Bessemer *U1*	4.725	5.65	5.825				
So. Chicago *R3*				7.90			
Ensley *T2*	4.725	5.65					
Fairfield *T2*		5.65		7.90		5.625	
Gary *U1*	4.725	5.65				5.625	
Ind. Harbor *I3*	4.725		5.825	7.90		5.625	
Johnstown *B3*		5.65					
Joliet *U1*		5.65	5.825				
Kansas City *S2*				7.90			
Lackawanna *B3*	4.725	5.65	5.825			5.625	
Minnequa *C6*	4.725	6.15	5.825	7.90		5.625	12.40
Pittsburgh *O1*							
Pittsburgh *P5*							
Pittsburgh *J3*				7.90			
Seattle *B2*				8.40		5.775	12.90
Steelton *B3*	4.725		5.825			5.625	
Struthers *Y1*				7.90			
Torrance *C7*						5.775	
Williamsport *S5*		5.65					
Youngstown *R3*				7.90			

ELECTRICAL SHEETS

22-Gage F.o.b. Mill Cents Per Lb	Hot-Rolled (Cut Lengths)*	Cold-Reduced (Coiled or Cut Length) Semi-Processed	Fully Processed
Field	8.40	8.60	
Armature	9.35	9.60	10.10
Elect.	9.95	10.20	10.70
Motor	10.95	11.20	11.70
Dynamo	11.85	12.10	12.60
Trans. 72	12.80	13.05	13.55
		Grain Oriented	
Trans. 65	13.35	Trans. 80	17.45
Trans. 58	13.85	Trans. 73	17.95
Trans. 52	14.85		

Producing points: Beech Bottom (*W5*); Brackenridge (*A5*); Granite City (*G2*); Indiana Harbor (*I3*); Mansfield (*E2*); Newport, Ky. (*N5*); Niles, O. (*N5*); Vandergrift (*U1*); Warren, O. (*R3*); Zanesville (*A7*).

* Coils 75¢ higher

MERCHANT WIRE PRODUCTS

F.o.b. Mill	Standard & Coated Nails	Woven Wire Fence 9-15½ ga.	"T" Fence Posts	Single Loop Bale Ties	Galv. Barbed and Twisted Barbless Wire	Merch. Wire Annld	Merch. Wire Galv.
	Col	Col	Col	Col	Col	¢/lb.	¢/lb.
Alabama City *R3*	152	162		173	175	7.40	7.80
Aliquippa, Pa. *J3*	152	162				7.40	7.80
Atlanta *A8*	154	167		175	180	7.50	8.025
Bartonville *K2**	154	168		175	181	7.50	8.075
Buffalo *W6*						7.40	7.80
Chicago, Ill. *N4**	152	166		173	179	7.40	7.975
Cleveland *A6*							
Cleveland *A5*						7.40	8.05
Crawfordsville *M4**	154	167		175	175	7.50	8.05
Donora, Pa. *A5*	152	162		173	175	7.40	7.80
Duluth *A5*	152	162		173	175	7.40	7.80
Fairfield, Ala. *T2*	152	162		173	175	7.40	7.80
Galveston *D4*							
Houston *S2*	157	170			180	7.65	8.20
Johnstown, Pa. *B3**	152	166			175	7.40	7.80
Joliet, Ill. *A5*	152	162		173	175	7.40	7.80
Kokomo, Ind. *C9*	154	164		175	177	7.50	7.90
Los Angeles *B2**						8.35	8.925
Kansas City *S2*	157	174		185	182	7.65	8.40
Minnequa *C6*	157	167		178	180	7.65	8.05
Monessen *P6*	152	162				7.40	7.80
Moline, Ill. *R3*							
Pittsburgh, Cal. *C7*	171	185			195	8.35	8.75
Portsmouth *P7*						7.40	
Rankin, Pa. *A5*	152	162			175	7.40	7.80
So. Chicago *R3*	152	162			175	7.40	7.80
S. San Francisco *C6*				197	195	8.35	8.75
Sparrows Pt. *B3**	154			175	181	7.50	8.075
Struthers, O. *Y1*						7.40	
Worcester *A5*	158					7.70	
Williamsport, Pa. *S5*							

* Galvanized products computed with zinc at 12.5¢ per lb. where indicated. Zinc at 5¢ per lb. for others.

C-R SPRING STEEL

Cents Per Lb F.o.b. Mill	CARBON CONTENT 0.25-0.40	0.41-0.60	0.61-0.80	0.81-1.05	1.06-1.35
Buffalo, N. Y. *R7*	7.00	8.95	10.50	12.65	15.35
Carnegie, Pa. *S9*		8.95	10.50	12.65	15.35
Cleveland *A5*	7.00	8.95	10.50	12.65	15.35
Detroit *D1*	7.10	9.05	10.60	12.75	
Detroit *D2*	7.10	9.05	10.60		
Harrison, N. J. *C11*					
Indianapolis *C5*			10.50	12.65	15.35
New Castle, Pa. *B4*	7.00	8.95	10.50	12.65	
New Haven, Conn. *D1*	7.45	9.25	10.80	12.95	
Pawtucket, R. I. *N7*					
Pittsburgh *S7*	7.00	8.95	10.50	12.65	15.35
Riverdale, Ill. *A1*	7.10	8.95	10.50	12.65	15.35
Sharon, Pa. *S1*	7.00	8.95	10.50	12.65	15.35
Trenton *R4*					
Wallingford *W1*					
Warren, Ohio *T4*					
Weirton, W. Va. *W3*	7.10	8.95	10.50		
Worcester, Mass. *A5*					
Youngstown *C5*	7.10	8.95	10.50	12.65	15.35

BOILER TUBES

$ per 100 ft. carload lots, cut 10 to 24 ft. F.o.b. Mill	Size OD-In.	Size B.W. Ga.	Seamless H.R.	Seamless C.D.	Elec. Weld H.R.	Elec. Weld C.D.
Babcock & Wilcox	2	13	30.87	36.51	29.94	
	2½	12	41.57	49.16	40.31	
	3	12	47.99	56.76	46.54	
	3½	11	56.03	66.27	54.34	
	4	10	74.41	88.00	72.16	
National Tube	2	13	30.87	36.51	29.94	
	2½	12	42.57	49.16	40.31	
	3	12	47.99	56.76	46.54	
	3½	11	56.03	66.27	54.34	
	4	10	74.41	88.00	72.16	
Pittsburgh Steel	2	13	30.87	36.51		
	2½	12	41.57	49.16		
	3	12	47.99	56.76		
	3½	11	56.03	66.27		
	4	10	74.41	88.00		

WAREHOUSES

Base price, f.o.b., dollars per 100 lb.

Cities	City Delivery Charge	Sheets: Hot-Rolled	Sheets: Cold-Rolled	Sheets: Galvanized (10 gage)	Strip: Hot-Rolled	Strip: Cold-Rolled	Plates	Shapes: Standard Structural	Bars: Hot-Rolled	Bars: Cold-Finished	Alloy Bars: Hot-Rolled 4615 As rolled	Alloy Bars: Hot-Rolled 4140 Annealed	Alloy Bars: Cold-Drawn 4615 As rolled	Alloy Bars: Cold-Drawn 4140 Annealed
Baltimore	$.10	7.03	8.32	8.95			7.21	7.93	7.61	8.62	14.38	13.96	16.36	16.29
Birmingham	.20	6.70	7.80	8.85	6.95			7.90	7.60	9.35				
Boston	.10	7.70-7.94	8.81	10.27	7.94-7.96	10.59	7.89	8.13	7.83	9.53	13.80	13.40-13.45	16.65	
Buffalo	.30	6.80	7.90	9.77	7.15		7.15	7.40	7.10	7.90		13.10		15.96
Chicago	.25	6.70	7.93	8.50	7.66		6.99	7.38	7.08	7.75		12.85		
Cincinnati	.25	6.92	7.92	8.90	7.30		7.28	7.75	7.32	8.05		13.09		
Cleveland	.30													
Denver		8.60	10.00	11.22	8.90		8.60	8.75	8.90	9.82				
Detroit	.25	6.99-7.03	8.12-8.32	8.78-9.10	7.34-7.65	8.15	7.21-7.27	7.75-7.93	7.36-7.61	8.04-8.62	13.40-15.54	13.05-13.44	16.25	16.10-16.49
Houston		7.35	7.80					7.60				13.25		
Kansas City	.20	7.47	8.60	9.17	7.73		7.66	7.95	7.75	8.52		13.52		
Los Angeles	.10	8.05	10.00	11.00	8.35		8.05	8.30	8.15	11.25*		14.25		17.85
Memphis	.10	7.12			7.38		7.31	7.60	7.40	9.15				
Milwaukee	.25	6.29	8.02	8.59	7.15		7.08	7.45	7.17	7.94		11.89		
New Orleans	.15	7.35	8.50		7.60		7.55	7.85	7.65	9.65				
New York	.10	7.46	8.68	9.44	8.07		7.28	7.99	7.96	9.48		13.18		16.23
Norfolk	.20	7.25			7.65		7.45	7.95	7.65	9.50				
Philadelphia	.10	7.14	8.42-9.02	9.35	7.67		7.37	7.74	7.64	8.46		13.16		
Pittsburgh	.25	6.80	7.93	9.28	7.16	9.00	6.99	7.28	7.08	7.85	13.20	12.85	16.05	15.90
Portland	.10	7.80	9.10	10.00	7.05									
Salt Lake City	.20													
San Francisco	.10	8.10	9.65	10.15	8.35		8.05	8.25	8.05	11.20*		14.25		17.85
Seattle	.00													
St. Louis	.25	7.09	8.22	9.19	7.35		7.28	7.68	7.37	8.14	13.49	13.14	16.35	16.19
St. Paul	.25													

Base Quantities (Standard unless otherwise keyed): Cold finished bars: 2000 lb or over. Alloy bars: 1000 to 1999 lb. All others: 2000 to 9999 lb. All HR products may be combined for quantity. All galvanized sheets may be combined for quantity. CR sheets may not be combined with each other or with galvanized sheets for quantity.

Exceptions: (3) 1500 to 9999 lb. (4) 1000 lb or over. (5) $.25 delivery. (6) 1000 to 1999 lb. $.25 delivery.

* Plus analysis charge.

Miscellaneous Prices

(Effective July 10, 1956)

TOOL STEEL

F.o.b. mill

W	Cr	V	Mo	Co	per lb
18	4	1	—	—	$1.60
18	4	1	—	5	2.305
18	4	2	—	—	1.765
1.5	4	1.5	8	—	.96
6	4	2	6	—	1.35
6	4	2	5	—	1.105

High-carbon chromium	.77
Oil hardened manganese	.43
Special carbon	.39
Extra carbon	.33
Regular carbon	.275

Warehouse prices on and east of Mississippi are 4¢ per lb higher. West of Mississippi, 6¢ higher.

CLAD STEEL

Base prices, cents per lb, f.o.b.

		Plate (*A3, J2, L6*)			Sheet (*I2*)
	Cladding	10 pct	15 pct	20 pct	20 pct
Stainless Type	304	30.30	33.15	36.05	32.50
	316	35.50	38.45	41.40	47.00
	321	32.60	34.85	37.75	37.25
	347	34.40	37.90	41.40	46.25
	405	25.60	29.60	33.35	
	410, 430	25.30	29.10	32.85	

LAKE SUPERIOR ORES

51.50% Fe; natural content, delivered lower Lake ports. Prices effective for 1956 season.

	Gross Ton
Openhearth lump	$11.25
Old range, bessemer	10.40
Old range, nonbessemer	10.25
Mesabi, bessemer	10.25
Mesabi, nonbessemer	10.10
High phosphorus	10.00

COKE

	Net-Ton
Furnace, beehive (f.o.b. oven) Connellsville, Pa.	$13.00 to $13.50
Foundry, beehive (f.o.b. oven) Connellsville, Pa.	$16.00 to $16.50
Foundry, oven coke	
Buffalo, del'd	$28.08
Chicago, f.o.b.	24.80
Detroit, f.o.b.	25.50
New England, del'd	30.05
Seaboard, N. J., f.o.b.	24.50
Philadelphia, f.o.b.	24.00
Swedeland, Pa., f.o.b.	24.00
Plainesville, Ohio, f.o.b.	25.50
Erie, Pa., f.o.b.	25.00
Cleveland, del'd	27.43
Cincinnati, del'd	26.56
St. Paul, f.o.b.	23.75
St. Louis, f.o.b.	26.00
Birmingham, f.o.b.	22.65
Lone Star, Tex., f.o.b.	18.50

ELECTRODES

Cents per lb, f.o.b. plant, threaded, with nipples, unboxed.

GRAPHITE			CARBON*		
Diam. (in.)	Length (in.)	Price	Diam. (in.)	Length (in.)	Price
24	84	22.00	40	110	10.00
20	72	21.20	40	108, 110	9.50
16 to 18	72	21.00	30	110	9.00
14	72	22.00	30	110	9.00
12	72	22.20	24	72 to 84	9.00
8 to 10	60	22.70	20	60	9.00
7	60	23.00	17	72	9.00
6	60	23.80	14	72	10.20
4	48	26.00	16, 12	60	11.10
3	40	30.00	8	60	11.40
2½	30	30.70			
2	24	47.75			

* Prices shown cover carbon nipples.

BOLTS, NUTS, RIVETS, SCREWS

(Base discount, f.o.b. mill)

Machine and Carriage Bolts

	Discount Less Case	C.
½ in. & smaller x 4 in. & shorter	2	22
½ in. & smaller x 6 in. & shorter	+3	18
9/16 in. & ⅝ in. x 6 in. & shorter	+4	17
¾ in. & larger x 6 in. & shorter	+6	15
All diam. longer than 6 in.	+15	8
½ in. & smaller x 6 in. & shorter	+3	18
Lag, all diam. x 6 in. & shorter	6	25
Lag, all diam. longer than 6 in.	+2	19
Plow bolts	23	23

Nuts, H.P., C.P., reg. & hvy.

	Base Discount	Discount, Case or Keg
¾" or smaller	55	64
⅞" to 1¼" inclusive	58	66
1⅜" to 1½" inclusive	60	67½

C.P. Hex. regular & hvy.

All sizes	55	64

Hot Galv Nuts (all types)

⅝" or smaller	38	50
⅞" to 1½" inclusive	41	52½

Finished, Semi-finished, Slotted or Castellated Nuts

All sizes	55	66

Rivets

	Base per 100 lb
½ in. & larger	$9.25
	Pct Off List
7/16 in. and smaller	37

Cap Screws

	Discount Bright	H.C. Heat Treated
New std. hex head, packaged ⅝" x 6" and smaller and shorter	38	28
¾", ⅞", 1" x 6" and shorter	15	1
New std. hex head, bulk* 5" x 6" and smaller and shorter	50	42
¾", ⅞", 1" x 6" and shorter	32	21

*Minimum quantity per item:
15,000 pieces ¼", 5/16", ⅜" diam.
5,000 pieces 7/16", ½", 9/16", ⅝" diam.
2,000 pieces ¾", ⅞", 1" diam.

Machine Screws & Stove Bolts

Quantity	Discount Mach. Screws	Stove Bolts
Packaged, package list	33	43
Bulk, bulk list		
¼-in. diam. & under: 15,000- 99,999	17	59
¼-in. diam. & under: 100,000-199,999	25	63
¼-in. diam. & under: 200,000 & over	33	67
5/16-in. diam. & larger: 15,000- 49,999	17	59
5/16-in. diam. & larger: 50,000- 99,999	25	63
5/16-in. diam. & larger: 100,000 & over	33	67
All diam. over 3 in. long: 5,000- 49,999	..	59
All diam. over 3 in. long: 50,000- 99,999	..	63
All diam. over 3 in. long: 100,000 & over	..	67

Machine Screw & Stove Bolt Nuts

Quantity	Discount Hex	Square
Packaged, package list	30	33
Bulk, bulk list		
⅜-in. diam. & smaller: 15,000- 99,999	15	17
⅜-in. diam. & smaller: 100,000-199,999	23	25
⅜-in. diam. & smaller: 200,000 & over	31	33

REFRACTORIES

Fire Clay Brick

Carloads per 1000

First quality, Ill., Ky., Md., Mo., Ohio, Pa (except Salina, Pa., add $5.00)	$122.00
No. 1 Ohio	
Sec. quality, Pa., Md., Ky., Mo., Ill.	114.00
No. 2 Ohio	
Ground fire clay, net ton, bulk (except Salina, Pa., add $1.50)	18.00

Silica Brick

Mt. Union, Pa., Ensley, Ala.	$128.00
Childs, Hays, Pa.	133.00
Chicago District	138.00
Western Utah	
California	
Super Duty Hays, Pa., Athens, Tex., Windham	145.00
Super Duty Curtner, Calif.	163.00
Silica cement, net ton, bulk, Eastern (except Hays, Pa.)	21.00
Silica cement, net ton, bulk, Hays, Pa.	24.00
Silica cement, net ton, bulk, Chicago District, Ensley, Ala.	22.00
Silica cement, net ton, bulk, Utah and Calif.	

Chrome Brick

Per net ton

Standard chemically bonded, Balt.	$86.00
Standards chemically bonded, Curtner, Calif.	96.25
Burned, Balt.	80.00

Magnesite Brick

Standard Baltimore	$109.00
Chemically bonded, Baltimore	97.50

Grain Magnesite

St. ⅝-in., grains

Domestic, f.o.b. Baltimore in bulk fines removed	$64.40
Domestic, f.o.b. Chewaiah, Wash., Luning, Nev. in bulk	40.00
Domestic, f.o.b. Chewaiah, Wash., Luning, Nev. in sacks	46.00

Dead Burned Dolomite

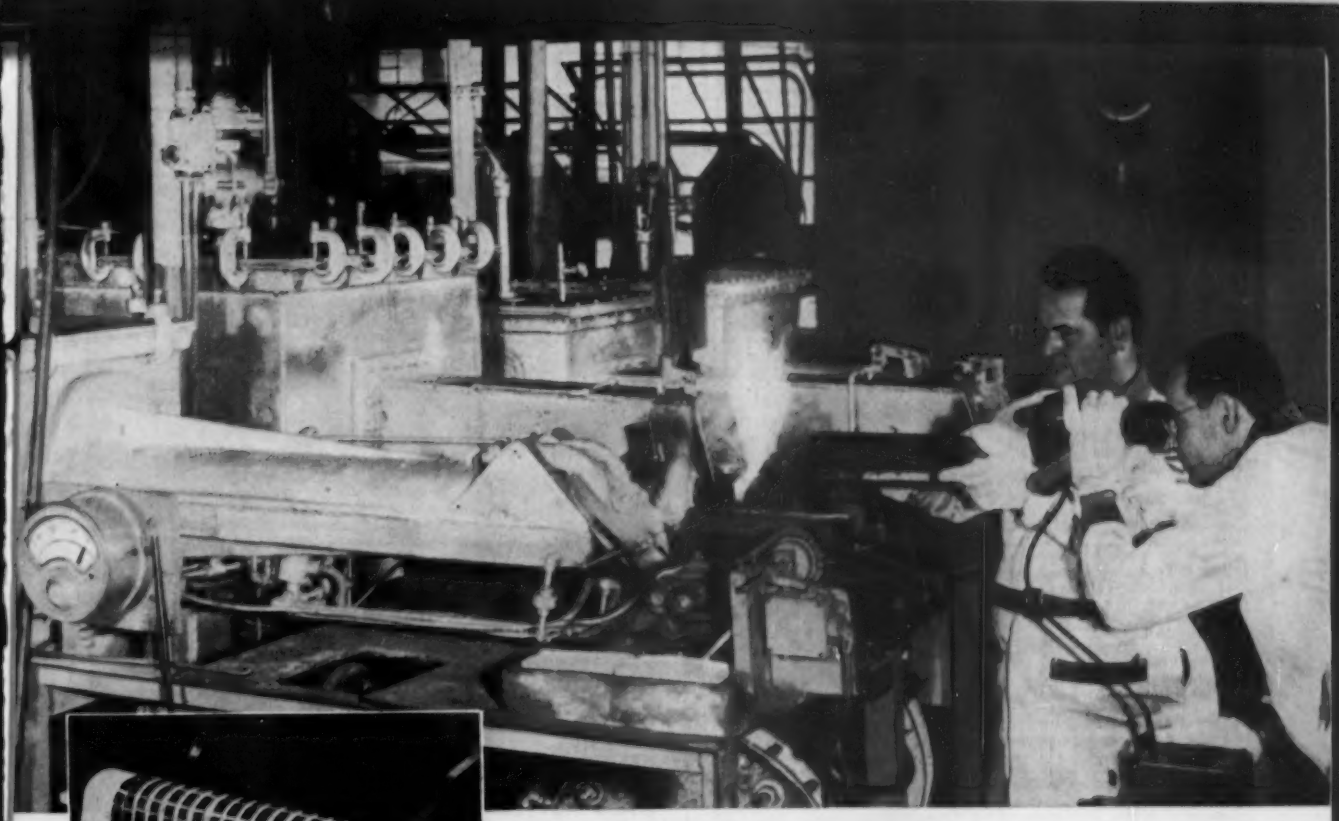
Per net ton

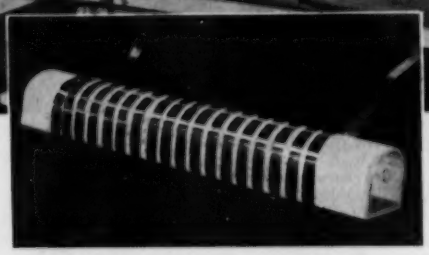
F.o.b. bulk, producing points in: Pa., W. Va., Ohio	$15.00
Midwest	
Missouri Valley	

METAL POWDERS

Per pound, f.o.b. shipping point, in ton lots, for minus 100 mesh.

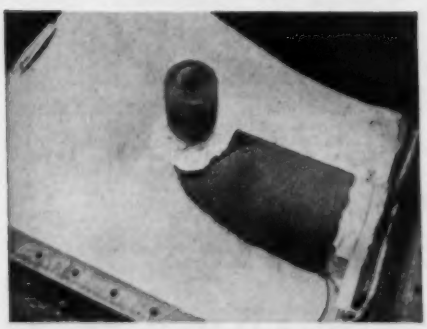
Swedish sponge iron c.i.f. New York, ocean bags	11.25¢
Canadian sponge iron, Del'd in East, carloads	9.5¢ / 10.75¢
Domestic sponge iron, 98+% Fe, carload lots	9.5¢
Electrolytic iron, annealed, imported 99.5+% Fe	27.5¢
Electrolytic iron, annealed, domestic 99.5+% Fe	36.5¢
Electrolytic iron, unannealed, minus 325 mesh, 99+% Fe	53.5¢
Hydrogen reduced iron minus 300 mesh, 98+% Fe	63.0¢ to 80.0¢
Carbonyl iron, size 5 to 10 micron, 98%, 00.5+% Fe	83.0¢ to $1.48
Aluminum	31.5¢
Brass, 10 ton lots	29.50¢ to 36.50¢
Copper, electrolytic	51.50¢
Copper, reduced	51.50¢
Cadmium, 100-199 lb. 95¢ plus metal value	
Chromium, electrolytic, 99% min., and quality, del'd	$3.60
Lead	23.50¢
Manganese	67.0¢
Molybdenum, 99%	$2.75
Nickel, unannealed	89.50¢
Nickel, annealed	96.50¢
Nickel, spherical, unannealed	93.50¢
Silicon	43.50¢
Solder powder 7.0¢ to 9.0¢ plus met. value	
Stainless steel, 302	91.0¢
Stainless steel, 316	$1.10
Tin	14.04¢ plus metal value
Tungsten, 99% (65 mesh)	$4.05
Zinc, 10 ton lots	17.5¢ to 25.0¢





This molybdenum ribbon-wound ALFRAX muffle is rugged and long-lasting.

ALFRAX tubes and muffles will not react with atomic hydrogen.



Complete insulation with alumina "bubbles" . . . by the shovelful.

For high-temperature electric furnaces

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resist atomic hydrogen and extreme heat . . . are easily installed!

CARBORUNDUM® has developed a complete line of refractories for hydrogen or cracked-ammonia atmosphere furnaces heated by molybdenum elements. ALFRAX PK refractories are made of pure granular alumina and resist temperatures up to 3000 F. (They contain no silica or reducible oxides . . . to be affected by atomic hydrogen formed at these extreme temperatures).

ALFRAX materials come in a wide variety of forms to fill furnace-design needs:

. . . **as muffles, tile, brick,** or other normally required special shapes.

. . . **as tiny bubbles of pure alumina** that can be shovelled into muffle-type furnaces . . . for insulation between the shell and the wound muffle.

. . . **as pure alumina castable cement** that is simply mixed with water for use anywhere you want the convenience of a castable.

. . . **as embedding cement** to coat heating elements . . . that insulates and withstands extreme heat.

ALFRAX refractories offer other advantages—chemical inertness, excellent electrical resistance at high temperatures, and dimensional acccuracy. Write today, for your free copy of our booklet on these refractories for high-temperature electric furnaces. Address Dept. B75, The Carborundum Company, Refractories Division, Perth Amboy, N. J.

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. . . also offers these advanced special-purpose super refractories: silicon carbide • fused aluminum oxide • electric furnace mullite • stabilized zirconia • boron nitride • boron carbide • zirconium boride • titanium boride • chromium boride • molybdenum boride • nickel aluminide.

Ferroalloy Prices

(Effective July 19, 1955)

Ferrochrome

Contract prices, cents per lb contained Cr, lump, bulk, carloads, del'd, 65-72% Cr, 2% max Si.

0.025% C .. 36.00	0.15% C ...	33.75
0.025% C,	0.20% C ...	33.50
Simplex .. 34.50	0.50% C ...	33.25
0.06% C ... 34.50	1.00% C ...	33.00
0.10% C ... 34.00	2.00% C ...	32.75

65-69% Cr, 4-9% C 24.75
62-66% Cr, 4-6% C, 6.9% Si 25.60

S. M. Ferrochrome

Contract prices, cents per pound, chromium contained, lump size, delivered.

High carbon type: 60.55% Cr, 4-6% Si, 4-6% Mn, 4-6% C.

Carloads 25.85
Ton lots 28.00
Less ton lots 29.50

High Nitrogen Ferrochrome

Low-carbon type 67-72% Cr, 0.75% N. Add 5¢ per lb to regular low carbon ferrochrome price schedule. Add 3¢ for each additional 0.25% of N.

Chromium Metal

Contract prices, per lb chromium contained, packed, delivered, ton lots, 97% min. Cr, 1% max. Fe.

0.10% max. C $1.18
0.50% max. C 1.16
9 to 11% C 1.25

Low Carbon Ferrochrome Silicon

(Cr 34-41%, Si 42-49%, C 0.05% max.) Contract price, carloads, f.o.b. Niagara Falls, freight allowed, lump 4-in. x down, 24.75¢ per lb contained Cr plus 12.00¢ per lb contained Si. Bulk 2-in. x down, 25.05¢ per lb contained Cr plus 10.80¢ per lb contained Si. Bulk 1-in. x down, 25.25¢ per lb contained Cr plus 11.00¢ per lb contained Si.

Calcium-Silicon

Contract price per lb of alloy, lump, delivered.

30-33% Cr, 60-65% Si, 3.00 max. Fe.

Carloads 19.00
Ton lots 22.10
Less ton lots 23.60

Calcium-Manganese—Silicon

Contract prices, cents per lb of alloy, lump, delivered.

16-20% Ca, 14-18% Mn, 52-59% Si.

Carloads 20.00
Ton lots 22.30
Less ton lots 23.30

SMZ

Contract prices, cents per pound of alloy, delivered, 60-65% Si, 5-7% Mn, 5-7% Zr, 20% Fe ½ in. x 12 mesh.

Ton lots 17.50
Less ton lots 19.50

V Foundry Alloy

Cents per pound of alloy, f.o.b. Suspension Bridge, N. Y., freight allowed, max. St. Louis, V-5; 38-42% Cr, 17-19% Si, 8-11% Mn, packed.

Carload lots 16.60
Ton lots 18.10
Less ton lots 19.35

Graphidox No. 4

Cents per pound of alloy, f.o.b. Suspension Bridge, N. Y., freight allowed, max. St. Louis. Si 48 to 53%, Ti 9 to 11%, Ca 5 to 7%.

Carload packed 17.50
Ton lots to carload packed 18.50
Less ton lots 20.00

Ferromanganese

Maximum contract base price, f.o.b., lump size, base content 74 to 76 pct Mn.

Producing Point	Cents per-lb
Marietta, Ashtabula, O.; Alloy, W. Va.; Sheffield, Ala.; Portland, Ore.	9.50
Clairton, Pa.	9.50
Sheridan, Pa.	9.50
Philo, Ohio	9.50

Add or subtract 0.1¢ for each 1 pct Mn above or below base content.

Briquets, delivered, 66 pct Mn:

Carloads, bulk 11.85
Ton lots packed 13.65

Spiegeleisen

Contract prices, per gross ton, lump, f.o.b. Palmerton, Pa.

Manganese	Silicon	
16 to 19%	3% max.	$84.00
19 to 21%	3% max.	86.00
21 to 23%	3% max.	88.50
23 to 25%	3% max.	91.00

Manganese Metal

Contract basis, 2 in. x down, cents per pound of metal, delivered.

95.50% min. Mn, 0.2% max. C, 1% max. Si, 3.5% max. Fe.

Carload, packed 45.00
Ton lots 42.50

Electrolytic Manganese

F.o.b. Knoxville, Tenn., freight allowed east of Mississippi, f.o.b. Marietta, O., delivered, cents per pound.

Carloads 30.00
Ton lots 32.00
250 to 1999 lb 34.00
Premium for hydrogen - removed metal 0.75

Medium Carbon Ferromanganese

Mn 80% to 85%, C 1.25 to 1.50. Contract price, carloads, lump, bulk, delivered, per lb of contained Mn ..... 21.35¢

Low-Carb Ferromanganese

Contract price, cents per pound Mn contained, lump size, del'd Mn 85-90%.

	Carloads	Ton	Less
0.07% max. C, 0.06% P, 90% Mn	32.00	33.85	35.05
0.07% max. C	29.95	31.80	33.80
0.15% max. C	28.45	30.30	31.50
0.30% max. C	26.95	28.80	30.00
0.50% max. C	26.45	28.30	29.50
0.75% max. C, 80-85% Mn, 5.0-7.0% Si	23.45	25.30	26.50

Silicomanganese

Contract basis, lump size, cents per pound of metal, delivered, 65-68% Mn, 18-20% Si, 1.5% max. C for 2% max. C, deduct 0.2¢.

Carload bulk 11.00
Ton lots 12.65
Briquet contract basis carlots, bulk, delivered, per lb of briquet 12.45
Ton lots, packed 14.25

Silvery Iron (electric furnace)

Si 14.01 to 14.50 pct, f.o.b. Keokuk, Iowa, or Wenatchee, Wash., $85.00 gross ton, freight allowed to normal trade area. Si 15.01 to 15.50 pct, f.o.b. Niagara Falls, N. Y., $88.00. Add $1.00 per ton for each additional 0.50% Si up to and including 17%. Add $1.45 for each 0.50% Mn over 1%.

Silicon Metal

Contract price, cents per pound contained Si, lump size, delivered, packed.

	Ton lots	Carloads
96% Si, 2% Fe	20.10	18.00
97% Si, 1% Fe	20.60	18.50

Silicon Briquets

Contract price, cents per pound of briquets, bulk, delivered, 40% Si, 2 lb Si briquets.

Carloads, bulk 6.55
Ton lots 8.35

Electric Ferrosilicon

Contract price, cents per lb contained Si, lump, bulk, carloads, delivered.

25% Si	20.00	75% Si	14.40
50% Si	13.00	85% Si	16.10
65% Si	13.50	90% Si	17.25

Calcium Metal

Eastern zone contract prices, cents per pound of metal, delivered.

	Cast	Turnings	Distilled
Ton lots	$2.05	$2.95	$3.75
Less ton lots ..	2.40	3.30	4.55

Ferrovanadium

35-55% contract, basis, delivered, per pound, contained V.

Openhearth ..... $3.00-$3.10
Crucible 3.10- 3.20
High speed steel (Primos) .. 3.20- 3.35

Alsifer, 20% Al, 40% Si, 40% Fe. Contract basis, f.o.b. Suspension Bridge, N. Y., per lb.

Carloads ..... 9.25¢
Ton lots 10.15

Calcium molybdate, 46.3-46.6% f.o.b. Langeloth, Pa., per pound contained Mo $1.28

Ferrocolumbium, 50-60%, 2 in. x D contract basis, delivered per pound contained Cb.

Ton lots $6.90
Less ton lots 6.95

Ferro-tantalum-columbium, 20% Ta, 40% Cb, 0.30% C, contract basis, del'd, ton lots, 2-in. x D per lb con't Cb plus Ta..... $4.65

Ferromolybdenum, 55-75%, 200-lb containers, f.o.b. Langeloth, Pa., per pound contained Mo.. $1.42

Ferrophosphorus, electric, 23-26%, car lots, f.o.b. Siglo, Mt. Pleasant, Tenn., $4.00 unitage, per gross ton..... $90.00
10 tons to less carload..... $110.00

Ferrotitanium, 40% regular grade 0.10% C max., f.o.b. Niagara Falls, N. Y., and Bridgeville, Pa., freight allowed, ton lots, per lb contained Ti..... $1.35

Ferrotitanium, 25% low carbon, 0.10% C max., f.o.b. Niagara Falls, N. Y., and Bridgeville, Pa., freight allowed, ton lots, per lb contained Ti..... $1.50
Less ton lots..... $1.55

Ferrotitanium, 15 to 18% high carbon, f.o.b. Niagara Falls, N. Y., freight allowed, carload, per net ton..... $177.00

Ferrotungsten, ½ x down, packed, per pound contained W, ton lots, f.o.b..... $3.50

Molybdic oxide, briquets, per lb contained Mo, f.o.b. Langeloth, Pa. $1.37
bags, f.o.b. Washington, Pa., Langeloth, Pa. $1.34

Simanal, 20% Si, 20% Mn, 20% Al, contract basis, f.o.b Philo, Ohio, freight allowed, per lb.

Carload, bulk lump..... 15.50¢
Ton lots, packed lump..... 16.75¢
Less ton lots, lump, packed. 17.25¢

Vanadium Pentoxide, 86 - 89% V_2O_5 contract basis, per pound contained V_2O_5 ..... $1.28

Zirconium, contract basis, per lb of alloy.

35-40%, f.o.b. freight allowed, ton lots..... 26.00¢
12-15%, del'd, lump, bulk-carloads ..... 3.00¢

Boron Agents

Borosil, contract prices per lb of alloy del. f.o.b. Philo, Ohio, freight allowed. B, 3.14%, Si, 40-45%, per lb contained B.... $5.25

Bortam, f.o.b. Niagara Falls

Ton lots, per pound..... 45¢
Less ton lots, per pound.... 50¢

Corbortam, Ti 15-21%, B 1-2%, Si 2-4%, Al 1-2%, C 4.5-7.5%, f.o.b. Suspension Bridge, N. Y., freight allowed.

Ton lots per pound..... 10.00¢

Ferroboron, 17.50% min. B, 1.50% max. Si, 0.50% max. Al, 0.50% max. C, 1 in., x D, Ton lots... $1.20
F.o.b. Wash., Pa.; 100 lb up

10 to 14% B..... .85
14 to 19% B..... 1.20
19% min. B..... 1.50

Grainal, f.o.b. Bridgeville, Pa., freight allowed, 100 lb and over

No. 1 ..... $1.00
No. 4 ..... 65¢
No. 79 ..... 50¢

Manganese - Boron, 75.00% Mn, 15-20% B, 5% max. Fe, 1.50% max. Si, 3.00% max. C, 2 in. x D, del'd.

Ton lots $1.45
Less ton lots..... 1.57

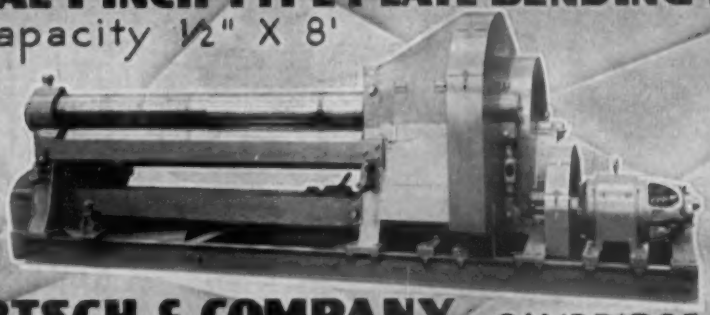
Nickel-Boron, 15-18% B, 1.00% max. Al, 1.50% max. Si, 0.50% max. C, 3.00% max. Fe, balance Ni, del'd less ton lots..... $2.05

Silcas, contract basis, delivered.

Ton lots ..... 45.00¢

INITIAL PINCH TYPE PLATE BENDING ROLL

Capacity ½" X 8'



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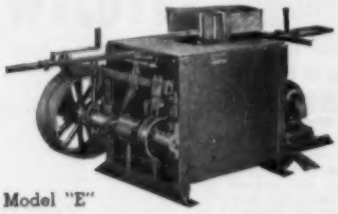
KARDONG STIRRUP BENDER

For Concrete Reinforcing Bars

This bender is the result of our 30 years' experience in the manufacture of reinforcing bar benders. One man can easily bend 300 four bend stirrups an hour. This bender is also a very practical bender for light slab bars and miscellaneous bending. Write for catalog of our complete line of reinforcing bar benders.



Model "E"

KARDONG BROTHERS, INC.

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STEEL-BRASS and ALUMINUM STAMPINGS

Looking for a dependable source of supply to keep an un-interrupted flow of parts coming in on scheduled time? Our reputation is behind every promise date. Send blueprints or samples for quotation.

WORCESTER STAMPED METAL CO.

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SUPERSALESMAN

100 Years' experience, has excellent contacts with 97% of the buying power in the metalworking industry. Will make over 160,000 calls every week—

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with EARLE GEARS!

TYPES AND DIAMETERS AVAILABLE

spur	3/8" to 34'	worm wheels	up to 98"
bevel and miter	1/2" to 165"	worms	any size
spiral	3/8" to 75"	pinions	any size
sykes herringbone	up to 60"	racks (straight or curved)	any size
other herringbone	up to 90"		

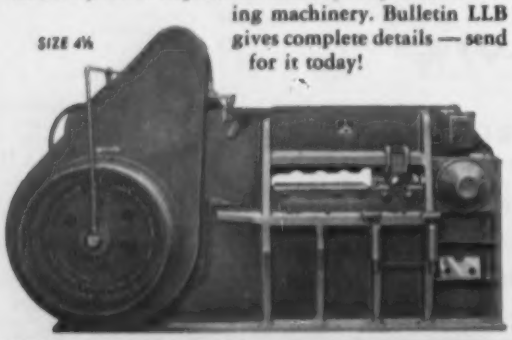
write, wire or phone **THE EARLE GEAR & MACHINE COMPANY**

4707 Stenton Ave., Philadelphia 44, Pa. • Cable Address: "EARLEGEAR" • Phones: Michigan 4-4707-8

New HILL ACME BAR SHEAR BILLET

This new BAR-BILLET shear has tremendous power and will cut rounds, flats, squares and special shapes without set-up changes. Clean, square cuts with a minimum of distortion, are guaranteed. Simplicity of design with fewer moving parts insures economical maintenance and the purchase price is LOW!

Designed and produced by HILL ACME with more than 50 years of experience in heavy duty metal working machinery. Bulletin LLB gives complete details — send for it today!



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"CANTON" DIVISION

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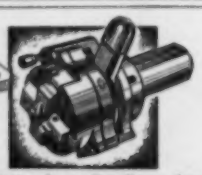
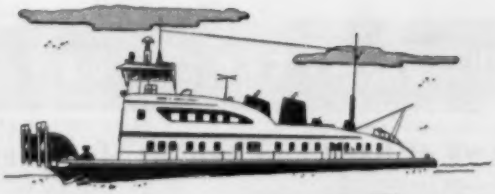


famous for accuracy and straightness of threads, low chaser costs, less downtime, more pieces per day.

THE EASTERN MACHINE SCREW CORP., 21-41 Barclay Street, New Haven, Conn.

Pacific Coast Representative: *A. C. Berbringer, Inc., 334 N. San Pedro St., Los Angeles, California* Canada: *F. F. Barber Machinery Co., Toronto, Canada*



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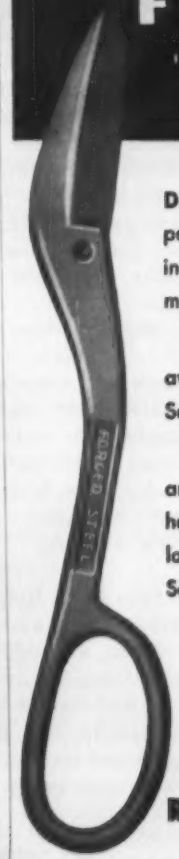

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News of Used and Rebuilt Machinery

Ohio Presses Jump . . . The market for low tonnage, large bed area, sheet metal presses has taken a major jump in Ohio and nationally, due to the increase in stamping activity.

Noll Equipment Co. in Cleveland, for instance, has had a 20 pct increase in these items for the first half of this year compared to last year, which was one of their better periods.

Market for the presses is developing from two major quarters: independent contract stampers; and tool and die designers who use them for testing out new dies in their own shop. Biggest demand is in the 50 to 60 ton capacity range with beds up to 60 in. wide. Since this type unit generally is subjected to only light duty, the units have a long life of service, making good used models difficult to locate.

Light Presses Surge . . . A major upsurge in proprietary sheet metal specialties is also causing a demand for lighter presses in this category. Chief among the products are home barbeques, incinerators, space heaters and others using principally 22 and 24 ga. metal.

Most of these presses are required to make only a few louvres, blank out some holes and handle related light jobs. The increased market for better living conveniences has brought into business a host of new fabricators for whom used machinery is a low-investment windfall.

Auto Parts Help . . . Auto parts suppliers are also a factor in the business although they generally take larger bed area presses.

A moderate revival of market for production grinders, turret lathes and drill presses is also being experienced in Ohio. Most of it is attributable to subcontracting generally, rather than for any particular industry. This hit its peak in the second quarter with no indications of a letdown in the third. Major drawback again is availability of good used models, especially radial drill presses.

Market Surplus . . . Disposal of surplus equipment from the Kittimat project of Aluminum Co. of Canada is moving forward nicely, according to the S & S Machinery Co. of Brooklyn, which is handling the sale.

At a recent count, sales were approaching the $4 million mark and S & S's policy of keeping sales on a negotiated basis was paying off in profit percentages unusually high for mass disposal operations.

The sale involves over 50,000 items of construction and mining equipment. Used in building British Columbia power and smelting facilities, surplus units are valued at more than $24 million.

Sell, Lease, Barter . . . To move this large bloc without "dumping equipment on the market," S&S has devised a wide range of acquisition arrangements. Equipment is being offered on a direct purchase, time payment, rental and, in the case of foreign firms, barter basis.

Some progress has been made in export marketing but the usual currency problems are holding down sales in this direction. The difficulty involves both dollar shortages and currency fluctuations. By the time negotiations have been completed, exchange rates may have changed to the point where prospective buyers are short of U. S. dollars.

Marketing of the equipment is expected to take at least a year. S & S president Simon Srybnik said, "We are attempting to meet this surplus disposal problem in an orderly way without undermining markets or hurting local business." He said the company wants to avoid auctions or similar methods.

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8' x ⅝" Webb 9L-3 Initial Type
12' x ¼" Hilles & Jones Pyramid Type
14' x 1" Williams & White Pyramid Type
16' x ⅜" Bertsch Initial Type Bending Roll
20' x 1" Hilles & Jones Pyramid Type Bending Roll

BRAKES—LEAF TYPE
8' x ¼" Dreis & Krump Size 186
12' x ⅛" Dreis & Krump, Motor Driven
16' x ⅛" Dreis & Krump No. 208

BRAKES—PRESS TYPE
12' All Steel Press Brake, 250 ton Capacity
10' x 3/16" Cincinnati No. 70
10' x ⅝" Cincinnati No. 100-10

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Clyde Double Drum Electric Car Puller, Capacity 43,750# Max. Starting Pull

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5 ton	P&H Trav-Lift	20' Span 230/440 A.C.
5 ton	Northern	57' Span 220/3/60 A.C.
5 ton	Toledo	60' Span 220 Volt D.C.
5 ton	Cleveland	90' Span 230 Volt D.C.
7½ ton	Shepard-Niles	23' Span 220/3/60 A.C.
10 ton	P&H	35' Span 220 Volt D.C.
10 ton	Niles	52' Span 230 Volt D.C.
10 ton	Shaw	72' Span 230 Volt D.C.
10 ton	Northern	75' Span 230 Volt D.C.
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500 ton HPM Fastraverse 4-Col. Press, 42" Stroke, 54" Daylight, Bolster 48" x 72"
1357 ton Baldwin Southwark Forging Press, 30" Stroke Main Ram, 54" x 41" Bet. Columns
1200 ton Lake Erie 4-Column, 36" Stroke 48x48" Bet. Columns, 13' Bt.oL Overall of Bed

PRESSES—INCLINABLE
#6½A Niagara, 150 ton, 12" Stroke
Cleveland, 125 ton, 12" Stroke

PRESSES—STRAIGHT SIDE
#304 Bliss, 8" Stroke
#308 Bliss, 255 ton, 14" Stroke

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Style EF Cleveland, 36" Throat, Punch 1⅛" thru 1" No. 16 Pels Universal Ironworker with Coper & Notcher
Style W Cleveland Single End, 60" Throat, 513 Ton

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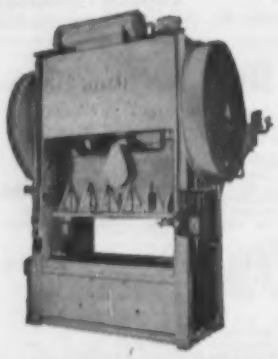

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1—FLYING SHEAR, Readleman type for bars.
1—PLATE SHEAR, capacity 9/16" x 156".
2—DRAWBENCHES, 50,000 lb. and 30,000 lb. capacities.
1—COKE OVEN PUSHER, used very little, excellent condition.
1—BONNOT-LENTZ BILLETEER, Size "A", maximum capacity 9" x 9".
4—SCALPING MACHINES for ingots and billets.
1—125-TON LADLE CRANE 25-ton auxiliary, 50' span.
1—50-TON CRANE, 52' 9" span, 10-ton auxiliary.
1—2000 HP MOTOR, 600 RPM, 6600/3/60.
1—1500 HP MOTOR, 595 RPM, 2200/3/60.
1—1800 HP GEAR DRIVE, ratio 19 to 1.
1—500 HP GEAR DRIVE, ratio 7.63 to 1.
1—SCRAP BALER, box size 84" x 18" x 36".
4—TINNING UNITS for hot dipped tin plate.

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2220 Oliver Building, Pittsburgh 22, Pa.
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GUARANTEED
ELECTRIC POWER EQUIPMENT
A. C. MOTORS
3 phase—60 cycle

SLIP RING

Qu.	H.P.	Make	Type	Volts	Speed
1	1500	G.E.	MT-498	2200	360
1	1500	ABB		2300	720
2	1000	A.C.	Mill	2300	240
1	800	G.E.	MT	2300	393
1	700	A.C.		2300	500
1	600	G.E.	M-574Y	6900	900
1	500	G.E.	MT-413	2300	580
1	500	Whse.	CW	550	350
1	400	Whse.	CW-940A	440	1170
1	400	Whse.	CW	440	514
1	400	Whse.	CW-1212	2200	435
1	350	G.E.	MT-447Y	2300/4000	258
3	300	G.E.	IM-17A	440/2200	720
1	250	G.E.	MT-434Y	4000	257
1	250	G.E.	MT-559B	2200	1800
1	250	Al. Ch.		550	600
1	200	Cr. Wh.	36QB	440	505
1	200	G.E.	IM	440	435
1	150	(unused) Whse.	CW	2200	435
2	125	A.C.		440	885
1	125	Al. Ch.		440	739
1	100	G.E.	IM-16	2300	435
1	100	G.E.	IM	440	600
4	100	A.C.	ANY	440	695

SQUIRREL CAGE

2	850	G.E.	FT-550BY	440	2570
1	800	G.E.	K-8545-B	2300	1185
2	450	Whse.	CR-1420	2300/4150	854
1	400	G.E.	IE-15B	2200	1165
1	400	G.E.	IK	2300	500
1	200	G.E.	IK-17	440	580
3	200	G.E.	KT-557	440	1800
1	150/75	G.E.	IK	440/900/450	
1	150	Whse.	CR-8568	440	850
1	150	Whse.	CR	440	580
2	125	Al. Ch.	ARW	2200	1750
1	100	Whse.	CW-576C-TKFC	440	710

SYNCHRONOUS

1	4256	C.W.	5501-SL	13800/6900	514
2	2100	G.E.	ATI	2300	360
2	2000	Whse.		2300	120
2	1750	G.E.	ATI	2300	3600
2	735	G.E.	ATI	2300/12000	600
1	500	Ideal	SM	2300/4160	1800
2	500	G.E.	TS-7567	2200	1200
1	450	Whse.		2200	128.5
1	450	Whse.		2200	450
1	400	G.E.	TS-7565	2300	1200
1	400	G.E.	TS	2300	400

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FOR SALE
All pieces late models and priced to sell

1—Industrial Systems Washing Machine, 6'10" x 6'6" x 7' Height, 7½ H.P. motor; 48" dia. Turntable; Steam Pr. 60 PSI; New 1953
1—16 ga. Milton Beading Machine; 13" throat; 7 sets rolls; reduction gear box; New 1948
2—Keller Contour Attachments bought for 18" Monarch Lathes; New 1948
1—"Roto-Clone" Bench for Magnesium Grinding; Exhaustor for 6000 CFM; 7½ H.P. Motor; All complete. New 1952
1—10,000# Tinius-Olsen Testing Machine, Model "LC" Universal, New 1952
1—Dennison MC-02 Multipress (4 ton) New 1946
1—Wilson Rockwell Tester—Extra Large Cap. New 1954
1—Oven 300° F. Despatch with walk in doors. Style "S" Steam, Automatic Controls, Serial #34079, 5'0" x 8'0" x 6'3". New 1949
1—Silica-Gel Dehydrating Unit, New 1951
1—Electric Driven Power Winch—10 ton, New 1953
1—36" Bullard, New Era $2,500.00—New 1937
1—Solvent Spray Machine; Portable
2—Sanding Machines, Hammond, New 1947
1—Jet Sand Blast Machine, Renton, Model A-1M-A, 31"x24" Cap. 60# Slurry, New 1952
1—Milton Slip Roll, 4½" x 25" Double Gear, New 1946
1—Liquid Honing Cabinet—Renton, 60" x 60" Foot controls, All complete w/4 blast nozzles New 1953
1—Sheet Metal Shrinking Machine, 5/64" Cap. 18" throat depth, 1/4" stroke, 900 to 1800 RPM Motor, New 1953
1—Ball Type Furnace—Westinghouse 1600° F. 250 Cu. Ft. per Hr., 16 Ounce air and gas pressure. Ready to operate, New 1949
3—60 KVA Spot Welders—National 440 V—All controls, Etc., New 1949
1—100 KVA Spot Welders—National 440 V—All controls, Etc., New 1948
1—180 KVA Spot Welders—Sciaky 460 V—All controls, Etc., New 1948
1—Wheelabrator Sand Blasting Cabinet; 72" x 54" x 36"; Doors are 49" x 36"; Rinse Tank; Gun; Tank; Tank Heaters. New 1953

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Constant Duty, 3-phase, 60 cycle

Qu.	H.P.	Make	Type	Volts	R.P.M.
1	5000	G.E.	MT-13	6600	600
1	1250	Whse.	C.W.	6600	881
1	1200/1500	G.E.	MT-498	2300	357
1	750	G.E.	I-M	2300	600
1	600	G.E.	MT	2300	585
1	600	Whse.	C.W.	2200	444
1	600	G.E.	MT-80	2200	360
1	600	Al. Ch.	ANY	2200	585
2	500	G.E.	I-M	2300	450
3	400	G.E.	I-17-M	2300	875
1	400	G.E.	MT-434	440	360
1	400	Al. Ch.	ANY	2200	585
1	400	G.E.	MT-413	2200	440
1	300	G.E.	I-17-M	2300	580
1	250	G.E.	M-6335-B	2300	1200
1	250	Whse.	CW-987	440	1200
1	250	Al. Ch.	ANY	440	705
1	250	Whse.	CW	2200	450
1	250	G.E.	MT-414	2300	300
1	200	Whse.	CW	440	600
1	150	Al. Ch.	ANY	440	705
1	150	Al. Ch.	ANY	2300	600
2	150	G.E.	I-17-M	440	450
1	125	G.E.	I-15-M	2300	600
1	100	G.E.	I-14-M	2300	720
1	104	Whse.	CW	440	870

SYNCHRONOUS MOTORS
3-Phase, 60-Cycle

Qu.	H.P.	Make	P.F.	Volts	R.P.M.
2	2100	G.E.	100	2300	360
2	2000	G.E.	80	2300	720
1	1750	G.E.	100	2300	360
1	1000	Whse.	80	2300	360
1	1000	Whse.	80	2300	225
1	800	El. Mchy.	80	440	1200
1	750	G.E.	80	2300	450
2	700	G.E.	80	2300	1200
1	710	G.E.	80	2300	720
1	250	G.E.	80	440	450
1	250	G.E.	100	2300	514
2	200	Whse.	80	440	1200
1	187	G.E.	80	440	750
1	150	G.E.	100	2200	900
1	150	G.E.	100	550	600
1	150	Whse.	80	440	450
2	125	G.E.	80	4000/2300	1200
2	125	El. Mchy.	100	4800/2400	900
1	125	G.E.	80	2300	900
2	100	Whse.	80	440	1800
1	100	Ideal	80	440	900
3	100	G.E.	80	440	600
1	100	El. Mchy.	100	440	580

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13" Knives

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32" Bullard Vertical Turret Lathe Serial #14081

36" New Era Bullard Serial #7138

#500 Hanchett Vertical Surface Grinder Ser. #500-17

2-3-4 Spindle Leland Gifford Drills

#24 Tri-Way 5" Universal Boring Mill Serial #T2436

3-½" Late Type Defiance Horizontal Table Type Boring Machine Serial #921-50

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500	Westg.	4600	250
400	G.E.	2300	270
400	Al.-Ch.	2300	120/240
300	G.E.	2300	250/275
200	Westg.	4160/2300	275
200	Ridgeway	2300	250
170	G.E.	440	125
150	G.E.	2300	125/250
150	Al.-Ch.	2300	270
150	Westg.	2300	125/250
150	G.E.	440	275
100	G.E.	2300	250
100	Westg.	440	125
100	Elec. Mch.	440	125
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1 Williams White #348—19" stroke Bulldozer with G.E., 10 H.P.—440 V—60 cy.—3 ph. Motor and Reeves drive

1 Williams White #3—16" stroke Bulldozer with F.M., 7½ H.P.—440 V—60 cy.—3 ph. Motor and drive

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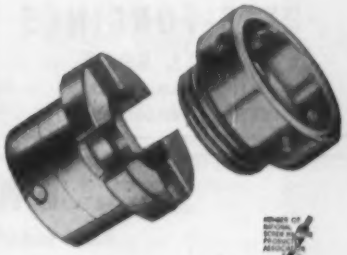

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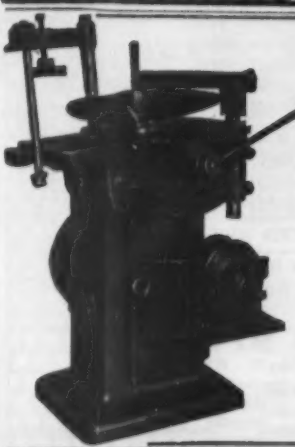

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